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THE COMMERCIAL CAR JOURNAL

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Peerless Trucks Handle Big Business Promptly

SIXTEEN times a day this 5-ton Peerless Truck was loaded at the Albany Street wharf of The Staples Coal Co. in Boston.

Sixteen times it made a round trip to the State House, carrying each time ten thousand pounds of coal through heavily crowded streets.

At the close of the day it had received, transported and promptly discharged a tonnage equivalent to the capacity of two large cars—a hundred and sixty thousand pounds.

Without over-strain, it performed work that would have taxed eight horses to the utmost.

Peerless Trucks operate satisfactorily because they are designed and built correctly.

TRUCK DEPARTMENT
THE PEERLESS MOTOR CAR CO., CLEVELAND

Builders also of Peerless Passenger Cars

PUBLISHED THE 15TH OF EACH MONTH

CHILTON COMPANY

MARKET & 49TH STS. PHILADELPHIA

STEEL WHEELS

An important feature of the Locomobile Five-Ton Truck is the use of Steel Wheels.

Steel Wheels are stronger and lighter than wooden wheels, and are not affected by the weather.

Truck tires wear longer on steel wheels than on wooden wheels for the following reasons:

Steel Wheels retain their circular form under all conditions, thus presenting an immovable base for the tires. This eliminates destructive stresses in the tires, and thus prolongs their life. Also, due to the conductivity of steel, any heat generated in the tires is transmitted to the steel spokes and radiated to the atmosphere.

The unusually large size of Locomobile Front Wheels, namely: 40 inches in diameter, is another favorable factor contributing to tire service. It makes the Front Tires interchangeable with the Rear Tires, making it unnecessary to carry more than one size of tire in stock. It also permits of better operating conditions. Large wheels mean ample clearance. In the Locomobile Truck the clearance is 15 inches at the center of the front axle, and 18 inches at the center of the rear axle.

Other important features of the Locomobile Five-Ton Truck are:

Every part designed for heavy truck duty.
Highest standards of workmanship.
Best materials used.
Motor—45 H. P. at 900 R. P. M.
Five bearing crank shaft.
Four speed transmission.
Large transmission gears.

These features combined only in the Locomobile Five-Ton truck.

Interchangeable Demountable Tires.
Driving chains each stand 44,000 lbs. pull.
Differential lock.
Steel Wheels.
Dry Disc Clutch.
Sprags.
All parts easily accessible.

Ignition and oiling system not subject to driver's control.

THE LOCOMOBILE COMPANY OF AMERICA, Bridgeport, Connecticut

Service and Sales Branches

New York	Chicago	Philadelphia	St. Louis	Minneapolis	Baltimore	Oakland
Atlanta	Los Angeles	Bridgeport	San Francisco	Boston	Pittsburgh	Washington

This advertisement is No. 5 in a series descriptive of Locomobile Design and Construction

THE PUBLISHERS' PERSONAL PAGE

Use the means, and trust to God for the blessing

An Opportunity

The present offers the greatest opportunity to the manufacturer of commercial vehicles which has yet presented itself.

The inauguration of the Parcels Post system opens a new field for the use of commercial vehicles. Individual contractors will bid for the business competitively, and large numbers of trucks will be required.

Are You Known?

Do you advertise in such a way that your product is familiar to the interested business men and their purchasing agents? When they think of a product, is the name of your machine uppermost in their minds? When you think of paint, the name of one manufacturer whose product is world-famous comes into your mind, and why? Because he advertised. If you think of a fountain pen, again a certain name presents itself. It matters not whether it is a safety razor, a perfume, or a truck, the name which stands out prominently is the one that is advertised.

Does It Pay?

This is a question frequently asked by the one who does not advertise. What is the answer? The largest business is linked with the best known name. Did this business wait until it was the largest, before advertising? No; advertising made it the largest. You can do the same with your business, but you must present the facts to the public. It matters not if your product is good, if your material is of the best, if the workmanship is perfect,—as long as these facts are not known. There is but one answer:

Advertise

You desire to interest the man who is interested in motor transportation. We are appealing to this very man with every issue. The COMMERCIAL CAR JOURNAL goes direct to the greatest number of those interested in the problem of commercial motor cars. Through it you can make a direct and personal appeal. Let us cooperate with you.

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We recently ran across the following apt story:

There was once a man who didn't believe in advertising.

He swore he would never advertise his business under any circumstances.

HE WAS RIGHT!

It was advertised for him—BY ORDER OF THE SHERIFF.

Of course, all those firms who don't advertise are not sold out by the sheriff; and all firms who *do* advertise do not escape the sheriff. But the majority of firms who advertise right are more successful than those who do not advertise at all. Hence—on the law of average—your chances are better in the hands of the publisher than in the hands of the sheriff, which means that it is more profitable to advertise than to be advertised.

The Necessary Link

The Autocar

"Used in Every Line of Business"

L. Bamberger & Company, of Newark, N. J., purchased their FIRST AUTOCAR from us in October, 1910, and now own NINE. This modern store got the right start in their delivery department by beginning their motor service with Autocars. Their growth is the result of satisfactorily solving the problems of store equipment by installing modern appliances in all departments.

Modern Stores Must Have Modern Delivery Service

The "Dry Goods Economist" published an editorial some months ago regarding Modern Delivery Service, which merits reprinting :

"The demands of the shopper for extreme promptness in delivery service have frequently been the subject of harsh criticism, and yet the recognized necessity of pleasing the public has caused the most successful stores to more than answer this demand. To theorize about the unfairness of having to provide prompt delivery for distant customers is of no avail. The condition exists and THE MERCHANT MUST MEET IT."

The AUTOCAR Company has sold cars to concerns in "every line of business," who not only are enabled to hold their customers by providing prompt delivery service, but have increased their delivery territory in many cases 100 per cent.

After a merchant realizes that in order to keep up to date he must adopt motor trucks, he turns his attention to the purchase of the car best suited to his purpose and pocketbook. We know of many instances where the merchant has paid too much or too little for his motor vehicle, either because he purchased a car too light in construction to withstand the daily delivery grind, or too large for the prompt handling of his particular merchandise.

The value of our trucks for delivery purposes is indorsed by over 700 individuals and corporations, who bear testimony that the AUTOCAR has been A GOOD INVESTMENT. The AUTOCAR is the recognized leader in the delivery field, built for economical service, and with lasting qualities to withstand hard daily use in all climates and all seasons.

The "right start" in motor transportation means your business advancement. Begin your motor delivery service with an AUTOCAR.

Write for catalogue and booklet showing delivery car designs.

Continuous Efficiency Guaranteed

THE AUTOCAR COMPANY, Factory, ARDMORE, PENNA.

(ESTABLISHED 1897)

Sales and Service Buildings

PHILADELPHIA, NEW YORK, NEWARK, BOSTON, PROVIDENCE

Chicago, St. Louis, San Francisco, Los Angeles, Minneapolis, Louisville, Toronto, Buffalo, Scranton, Harrisburg, Baltimore, Washington, Atlanta, Reading, San Juan, Wilmington

The Commercial Car Journal

VOLUME IV PHILADELPHIA, NOVEMBER 15, 1912 NUMBER 3

Rapid Expansion of the Commercial Vehicle Industry

IT is doubtful whether even those who are actively engaged in the industry are aware of the tremendous expansion which has taken place in the manufacture and use of commercial motor cars. The number of makers of commercial motor cars has increased so rapidly that at the present time there are more manufacturers of commercial cars than there are of pleasure vehicles, and a much more rapid increase in the number of commercial cars manufactured is taking place than was the case in the early stages of pleasure car building. The figures we give in the tables beneath are for the greater part actual figures supplied by the manufacturers themselves. These have been supplemented by investigation by men who are in close touch with the trade, and know what each manufacturer is doing.

It will be seen that the number of gasoline cars built during the year past is 34,701. This is greatly in excess of the number which was estimated would be built at the start of the year, the estimates being at that time from 20,000 to 30,000. It is safe to say that fully 35,000 gasoline commercial cars were built during the past twelve months. The figures supplied by manufacturers would show that approximately 80,000 gasoline commercial cars will be built during the coming year. This is more than double previous year's output, and is probably based on each manufacturer's fondest hopes. We believe, however, from a careful analysis of each manufacturer's figures, that this number will be fully equalled if the demand warrants it.

It is a fact that the makers of the smaller commercial cars at least can so regulate their output as to increase or diminish the number of commercial cars at will. For example, the Ford Company with its immense output of 200,000 cars for the coming year can make as many of these into commercial cars as they have demand for. As a matter of fact, this company did not push the commercial vehicle to any extent during the past year, and yet its sales of light delivery cars amounted to 1850 cars. This was out of a total product of 75,000 machines. It can be readily seen that the Ford Company can next year make from 5,000 to 50,000 light delivery wagons if they are wanted. Other companies making light delivery cars are in a similar position. With the larger trucks this is not the case, as the output of these cars must be fixed for each season a long period in advance.

The increase in the number of electric cars built is apparently not as great as in the case of the gasoline cars. We would state, however, that definite figures could not be obtained of the output of the electric commercial cars, to as great an extent as was the case with the gasoline cars, and as our estimates have in all cases been made as conservative as possible, the estimated electric production for 1913 may have suffered on this account.

From the table of the number of manufacturers of the various sizes of commercial cars, it will be seen that there are but few increases and in some cases there are reductions in the number of makers of a particular size car. This proves that the makers are concentrating more on one particular model. Instead of making five or six sizes of trucks, they

Number of Commercial Cars of Various Carrying Capacities Built During 1912 and to Be Built During 1913

GASOLINE

Carrying Capacity	1912 No. of Cars	1913 No. of Cars	Increase
500 lbs.	1011	1620	609
750 to 800 lbs.	3495	12745	9250
1000 to 1200 lbs.	4592	13660	9078
1500 to 1600 lbs.	4685	11960	7275
2000	5098	9710	4612
3000	3115	9618	6503
4000	3168	6418	3250
5000	425	75	
6000	4865	7094	2229
7000	276	1080	804
8000	1072	1395	323
9000 & 10000	2212	3255	1043
12000 and over	687	960	273
Total	34701	79590	45249

ELECTRIC

Carrying Capacity	1912 No. of Cars	1913 No. of Cars	Increase
600 to 800 lbs.	550	950	400
1000	1720	2800	1080
1500	125	250	125
2000	1240	1855	615
3000	195	275	80
4000	655	1010	355
5000	225	375	150
6000	160	200	40
7000	550	900	350
8000	110	125	15
9000 & 10000	345	700	355
12000 and over	10	25	15
Total	5885	9465	3580

Number of Manufacturers of Commercial Cars of the Various Sizes Last Year and Now

	No. of Makers a Year Ago		No. of Makers Now	
	Gasoline	Electric	Gasoline	Electric
500 lb.	6		4	
750-800 lb.	14	5	12	5
1000-1200 lb.	34	13	31	13
1500-1600 lb.	39	2	46	2
2000	66	9	62	9
3000	39	4	46	4
4000	56	5	57	5
5000	5	2	4	3
6000	58	4	52	3
7000	8	7	13	7
8000	15	2	15	2
9000 & 10000	44	5	43	5
12000 & over	12	1	12	1

Total Number of Makers of Commercial Cars

	A Year Ago	Now	Increase
Gasoline	246	304	58
Electric	29	37	8
Total	275	341	66

make one, two or three sizes, making a larger quantity of each size, and in that way cutting down the cost of production.

While the number of concerns listed as making commercial cars has increased considerably during the past year, it has not increased in the same proportion as has the number of cars built. In fact the increase is not as large as would be apparently shown by the table given, for although the table shows an increase of 58 gasoline commercial car makers over last year, it is a fact that of the 246 makers of a year ago, only 207 were actively manufacturing, and of the 304 commercial car makers now listed only 240 are actively manufacturing, which shows an increase of only 33 active manufacturers of commercial cars; consequently it is apparent that the outputs of those manufacturers who are active, has been greatly increased, which, of course, means a great strengthening in the trade generally.

It is a matter of record that a large number of the new companies which have started to manufacture commercial cars did not get beyond the experimental stage before they quit. At the present time there are probably more new makers starting than in any period of the history of this branch of the industry, and it is to be expected that some of these will not succeed, but with the market as active as it is now becoming, with very little necessity for missionary work, a very much larger percentage should succeed than was formerly the case.

N. A. A. M. MEETING AT DETROIT

National Association of Automobile Manufacturers held its annual Fall meeting November 13th, 14th and 15th, at Detroit, Mich. The Detroit makers appointed R. D. Chapin, S. D. Waldon, W. C. Leland, Hugh Chalmers, W. E. Metzger and H. W. Ford a committee of arrangements. The headquarters of the convention are at the Hotel Pontchartrain. The following papers of interest to the commercial car industry were read: "The Commercial Car," by S. D. Waldon; "Relation of the Volume of Motor Carriage Business to the Volume of Commercial Car Business," by David Beecroft; "Injudicious Methods of Selling Commercial Vehicles," by M. L. Pulcher; "Traffic," by J. S. Marvin; "Why All Manufacturers Should use the Standard Warranty," Walter C. White.

Considerable anxiety has been expressed by motor car manufacturers as to the probable shortage in the supply of freight cars during the coming winter, and the Interstate Commerce Commission is bringing pressure to bear on the railroads to secure more prompt return of freight cars to the railroad companies owning them, and to secure an increase in the speed of freight trains, which now only average 25 miles a day. It is expected that if these matters are properly attended to, that the movement of freight will be greatly facilitated.

New Factories and Trucks

Velie Motor Vehicle Company, Moline, Ill., has added a one-ton model to its line of commercial cars.

Reo Motor Truck Company, Lansing, Mich., has added a new two-ton model to its line of commercial cars.

The Winton Motor Car Company, Cleveland, O., is said to be turning out a six-cylinder 1½ ton commercial car.

Rockford Drop Forge Company, Rockford, Ill., it is stated have commenced the manufacture of 100 two-ton commercial cars.

Willys-Gramm Motor Truck Company, of Lima, O., will bring out a new truck of smaller capacity than their old models. This is stated to be a 1½-ton model.

Sandusky Auto Parts Company, Sandusky, O., manufacturers of the Sandusky trucks, are completing a new addition to their plant, which will practically double the output.

Buick Motor Company, Flint, Mich., has sold its truck factory at Jackson, to the Imperial Motor Company, and will hereafter manufacture the Buick trucks at the Flint factory on a very much larger scale.

The New Haven Truck and Automobile Works, New Haven, Conn., have added a new model to their 1913 line, namely, Model "D," a 1½-ton truck. In their Model "B" the power plant has been changed to a 45 h. p. motor.

Empire Automobile Company, 45-47 Warren Street, Glens Falls, N. Y., has secured a ten-year lease of entire property which they now occupy and will combine the manufacture of a high grade truck with the extensive garage business now conducted.

Gramm-Bernstein Company, Lima, O. The first truck to be turned out is now ready for the market. The truck is 3 1-2 tons capacity, and this type and another of 2 tons will be the only vehicles produced by the new company for the time being.

Piggins Motor Truck Company, Racine, Wis., has established a branch distributing depot on Golden Gate Avenue, near Larkin Street, San Francisco, Cal. J. I. McLoughlin will be manager of the branch. E. N. McNab, president of the company, expects to arrange for the establishment of a branch factory at San Francisco as well.

Torbenson Gear & Axle Company is now installed in its new plant at Newark, N. J., the increased facilities allowing a corresponding increase in output. A recent sale to the Brown Commercial Car Company, of Peru, Ind., was made of 50 of the Torbenson internal gear driven axles for use on U. S. Government ambulances.

Thank the Lord on Thanksgiving Day That You Have Had Horse Sense Enough to Use Trucks

PERSONAL MENTION

THOS. J. HAY has resigned the management of the Ford Motor Company's Chicago branch.

J. M. EVANS, formerly advertising manager of the Lozier Motor Company, has resigned his position.

H. E. SCHONACKER has resigned as general manager of the Marvel Carburetor Company, Flint, Mich.

R. E. DENNISON has been appointed district manager of the Stewart Motor Corporation of Buffalo with headquarters in Chicago.

D. E. KEITH, formerly manager of the Ford Company's Indianapolis branch, has been appointed manager of the Company's Chicago branch.

CLAUDE MERRY, formerly connected with selling staff of Modern Motor Truck Company, St. Louis, Mo., has become connected with Oldsmobile Company of Missouri.

C. L. MORGAN has resigned as manager of the Electric Division of the General Motors Truck Company, to become identified with the St. Louis Billing Machine Company.

L. A. AUSTIN, formerly sales manager of the Western Motor Company, has resigned to accept the same position with the Mais Motor Truck Company, Indianapolis, Ind.

O. S. HOLLY, who was formerly in charge of the truck department of the Detroit Packard branch, has been appointed manager of the New York City branch of Kelly Motor Car Company.

J. R. ELLIOTT has been appointed district manager for the states of Washington and Idaho and the Province of British Columbia of the Lippard-Stewart Motor Car Company, Buffalo, N. Y.

C. J. CARPENTER, salesman in truck department of White Motor Car Company of Cleveland, O., is now located in western Michigan territory, making his headquarters with Stratton-Woodcock Auto Company of Grand Rapids.

GEORGE A. MEVIS, formerly manager of the truck department of Knox Automobile Company, Springfield, Mass., has resigned to accept position as manager of the truck department of a Boston automobile company.

J. G. BUDD, manager of the Victor Motor Truck Company, Buffalo, N. Y., has resigned that position to become general sales manager of the Sanford Motor Truck Company, manufacturers of Sanford Motor Trucks.

JOHN M. MACK, Allentown, Pa., formerly of the Mack Bros. Motor Car Company, a constituent of the International Motor Company, has been elected chairman of the executive board of the Lansden Company, Newark, N. J.

HAROLD SMITH, former advertising manager of the General Motors Company, Pontiac, Mich., has resigned to enter the Carl M. Green Advertising Agency, and will handle the advertising of the truck company from that office.

E. C. LACOSTE, formerly with the Speedwell Motor Car Company, of Dayton, O., has taken charge of the Truck Sales Department of Stauffer, Eshelman & Company, Ltd., New Orleans, La., who are handling the Mais truck.

ROBERT E. FULTON has been promoted from manager of the New York branch of the International Motor Company, to the position of assistant sales manager, and David C. Fenner has succeeded him as manager of the New York branch.

W. M. BAXTER, who is well known in commercial car circles, having had charge of the western territory for the Dayton Electric Car Company, has been appointed sales manager in San Francisco for the Pan-American Motors Company, western distributors of Dayton trucks.

F. W. KURTZ has retired as director of advertising from the General Motors Company, of Detroit, Mich. The advertising of the General Motors Company will now be handled from the individual plants of the company, the general advertising department at Detroit being discontinued.

F. H. WHEELER has purchased the interest of his partner, Geo. M. Schebler, in Wheeler & Schebler, manufacturers of the Schebler carburetor, Mr. Wheeler now being sole owner. The business will continue without any change in the firm name, and Mr. Schebler will act in the capacity of consulting engineer.

O. F. CONKLIN, formerly chief engineer for Robbins & Myers Company, electric manufacturers of Springfield, O., has become consulting engineer for the Remy Electric Company, and will have charge of the new electric starting device which the Remy Company is placing on the market, which was designed by Mr. Conklin. Two new buildings have been erected for the production of this new device.

BENJAMIN BRISCOE, who recently resigned the presidency of the United States Motor Company, was tendered a banquet on November 7th at the Hotel Astor, by 73 of his associates in the United States Motor Company. Mr. Briscoe has sailed for Europe for a trip of about eight months, at which time he will return to embark in a new venture. He is taking one or two engineers with him to work out details of his new proposition.

WALTER E. FLANDERS WILL PROBABLY HEAD THE REORGANIZED UNITED STATES MOTOR COMPANY

It has been officially stated on behalf of the organization committee of the United States Motor Company that arrangements have been made subject only to the working out of details, to have Walter E. Flanders head of the reorganized company, as its president, taking in the Flanders Company, which now manufactures six cylinder cars.

The creditors of the United States Motor Company, and its subsidiary companies, to the amount of $10,000,000 have deposited under the plan of reorganization. A large amount of stock has likewise been deposited, and the first installment of amount payable has been paid. The plan for the reorganization of the company calls for an assessment of $24.00 a share on both preferred and common stock, which will amount to $5,720,000. This, with $1,000,000 cash on hand, will provide enough to pay all the claims of creditors not participating in the reorganization, and also $3,000,000 working capital.

The application made by some minority stockholders to intervene and set aside the proposed plan of reorganization has been denied by Judge Hough in the U. S. District Court.

The receivers have been authorized to issue receiver's certificates for $1,500,000 for the purpose of providing capital to operate the plants until the organization is effected. They have also been authorized to dispose of a number of retail branches throughout the country which have been operated at a loss. Several of the plants have been shut down and only those are being operated which can be operated profitably, among which is the Alden-Sampson Manufacturing Company's plant, which will be operated to its full capacity in the manufacture of Sampson commercial cars.

New Incorporations and Increases

Seattle Motor & Wagon Transportation Company, Seattle, Wash., has been incorporated by W. J. Beattie, with $20,000.

Packers Motor Truck Company, Warwood, W. Va., is increasing the capacity and output of the plant by installing machinery and employing about twenty-five more mechanics.

Dayton Motor Truck Company, Wilmington, Del., has been incorporated with $100,000 capital to manufacture, sell and deal in motor cars and trucks by E. E. McWhinney, Norman P. Coffin, Herbert E. Latter.

Industrial Motor Car Company, Middletown, N. Y., has been organized for the manufacture of commercial cars. Its officers are, President, Wm. G. Richardson; Vice President, W. A. Cotton; Secretary and Treasurer, R. M. Bagg.

Fiske Rubber Company, Chicopee Falls, Mass., has increased its capital to $10,000,000. A great deal of this increased capital is to take care of a new line of solid tires for commercial vehicles which this company will place on the market.

Goodyear Tire & Rubber Company, of South America, has been formed with a capital stock of $3,000,000 by members of the parent Goodyear Company. The new company will establish an automobile tire factory in the Amazon valley in Brazil. J. C. MacSavyean has gone to Brazil to take charge of the new enterprise.

Kissel Motor Car Company, which recently secured a new plant at Milwaukee, Wis., has also built two large additions to its Hartford, Wisconsin, plant, giving 40,000 sq. ft. additional floor space. The Milwaukee plant just acquired is almost as large as the old plant, and this company will more than double its output during the coming year.

Willys-Overland, Toledo, Ohio, have increased their capital stock from $15,000,000 to $25,000,000. A share of this increase was to provide additional working capital for the Willys-Gramm and Willys-Garford plants, which are making commercial cars. A new 1½-ton truck is to be added to the product of the Gramm factory. This new truck will be made in large quantities.

Minneapolis Motorcycle Company, 517 S. 7th Street, Minneapolis, Minn., has reorganized under the name of the Minneapolis Motor Company, and has increased its capital stock to $500,000. This company, which has been an extensive manufacturer of tricars, has secured a new plant at 1st Avenue N. E., and 6th Street, where the product will be greatly increased. A specialty is being made of tricars for mail delivery and collection which has been used to quite a large extent by postmasters and carriers. Among the new men interested in the company are F. E. Kenaston, of the Minneapolis Threshing Machine Company, and P. M. Starnes, of the American Timber Holding Company.

The Federal Chain & Manufacturing Company, of Springfield, Mass., announces it has purchased from the Atlas Chain Company, Brooklyn, N. Y., all rights to manufacture and sell "Gaylor" traction grips for commercial vehicles. The Federal Company will increase its line by the addition of a new type of solid tire grip to be known under the trade name of "Hercules." A new illustrated catalog covering the entire line of grips is being put out.

KELLEY TRUCK COMPANY EXPANDING

The Kelley Motor Truck Company, Springfield, O., has been recapitalized at $2,500,000, and name changed to the Kelley-Springfield Motor Truck Company. With the reorganization, the company announces a greatly increased output and some additional models added to their line. E. S. Kelley remains at the head of the company, and Chas. B. Shanks, who was recently appointed Pacific Coast sales manager, has been made general sales manager of the company. Mr. Shanks was formerly sales manager for the Winton Motor Car Company for a number of years.

KNOX REORGANIZATION

At a stockholders' meeting of the Knox Automobile Company, held October 16th, the committee arranged to investigate the business, and determine whether it could profitably be continued, reported favorably, and new officers and directors were elected a sfollows: President, W. E. Wright; Vice President, H. G. Fisk; Treasurer, A. E. Smith; Clerk, Charles H. Beckwith. The directors elected are: H. G. Fisk, E. O. Sutton, W. H. Chase, of Leominster; M. J. Greenwood, of Gardner; Elijah C. Johnson, of Hartford, Conn.; Peter Murray, W. H. Cutler, of North Wilbraham; W. E. Wright, C. H. Beckwith. The executive committee of the board of directors will be composed of Peter Murray, W. E. Wright and E. O. Sutton.

A committee of three was appointed, consisting of Judge Thos. Z. Lee, John J. Shannessy and C. C. Lewis, to consider all the final affairs of the company, and to work out a reorganization plan whereby the finances can be placed on a basis satisfactory to both stockholders and creditors. The statement of the company showed assets of $2,115,902 and liabilities of $1,252,361.

On November 1st, Judge Lee sent a letter to all stockholders explaining the hopes of the stockholders' committee to effect a reorganization of the concern. Accompanying this letter was a form of stockholders' agreement, calling for a deposit of stock with the Old Colony Trust Company, of Boston, pending the final reorganization. The agreement makes the committee a voting trust until the final plans are completed.

GENERAL MOTORS COMPANY'S YEARLY REPORTS SHOW LARGE INCREASES

The General Motors Company, in its report for the year ending July 31st, 1912, shows increases throughout its entire statement, the principal figures of which are included in the following:

Gross business 1912	$64,744,496.02
Gross business 1911	42,733,303.27
Employes in 1911	11,474
Employes at present time	17,173
Net profits for year 1912	$ 4,838,448.55
Preferred dividend for 1912	1,040,210.51
Undivided profits 1912	2,856,082.76
Profit and loss surplus 1912	1,262,594.88
Preferred stock outstanding	14,936,800.00
Common stock outstanding	16,371,183.05
Total capitalization	60,000,000.00
Net working capital	20,666,865.16
Current accounts payable	2,853,021.77
Value of plants and equipment	19,280,888.99

Wetherill Finished Castings Company, Philadelphia, Pa., is winding up its affairs, and is liquidating its assets to pay off its indebtedness.

CHICAGO COMMERCIAL CAR SHOW

Spaces have been allotted to the following exhibitors at the commercial car show at Chicago, February 10th to 15th:

Complete-Vehicle Exhibitors

COLISEUM

Adams Bros. Co., Findlay, O.
American Locomotive Co., New York City.
Autocar Co., Ardmore, Pa.
Buffalo Electric Vehicle Co., Buffalo, N. Y.
Buick Motor Co., Flint, Mich.
Clark Delivery Car Co., Grand Crossing, Ill.
Dayton Auto Truck Co., Dayton, O.
Federal Motor Truck Co., Detroit, Mich.
Flint Motor Wagon Dept., Flint, Mich.
Durant-Dort Carriage Co.
Garford Co., Elyria, O.
General Motors Truck Co., Pontiac, Mich.
Gramm Motor Truck Co., Lima, O.
Hupp Motor Car Co., Detroit, Mich.
International Motor Co., New York City.
Thos. B. Jeffery Co., Kenosha, Wis.
Kelly Motor Truck Co., Springfield, O.
Kissel Motor Car Co., Hartford, Wis.
Knox Automobile Co., Springfield, Mass.
Krebs Commercial Car Co., Clyde, O.
Locomobile Co. of America, Bridgeport, Conn.
W. H. McIntyre Co., Auburn, Ind.
Old Reliable Motor Truck Co., Chicago, Ill.
Peerless Motor Car Co., Cleveland, O.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pope Mfg. Co., Hartford, Conn.
Reliance Motor Truck Co., Owosso, Mich.
Reo Motor Car Co., Lansing, Mich.
Selden Motor Vehicle Co., Rochester, N. Y.
Speedwell Motor Car Co., Dayton, O.
Sternberg Mfg. Co., Milwaukee, Wis.
Studebaker Corp., Detroit, Mich.
United States Motor Truck, Cincinnati, O.
Velie Motor Vehicle Co., Moline, Ill.
Walker Vehicle Co., Chicago, Ill.
Waverley Co., Indianapolis, Ind.

COLISEUM ANNEX

Bowling Green Motor Car Co., Bowling Green, O.
Chase Motor Truck Co., Syracuse, N. Y.
Dart Mfg. Co., Waterloo, Ia.
Lippard-Stewart Motor Car Co., Buffalo, N. Y.
M & P Elec. Vehicle Co., Detroit, Mich.
Service Motor Car Co., Wabash, Ind.
Standard Motor Truck Co., Detroit, Mich.
Transit Motor Truck Co., Inc., Louisville, Ky.
Universal Motor Truck Co., Detroit, Mich.

FIRST REGIMENT ARMORY

Avery Co., Peoria, Ill.
Baker Motor Vehicle Co., Cleveland, O.
Bessemer Motor Truck Co., Grove City, Pa.
Brown Commercial Car Co., Peru, Ind.
Chicago Pneumatic Tool Co., Chicago, Ill.
Commerce Motor Car Co., Detroit, Mich.
Four-Wheel Drive Auto Co., Clintonville, Wis.
General Vehicle Co., L. I. City, N. Y.
Gramm-Bernstein Co., Lima, O.
Harwood-Barley Mfg. Co., Marion, Ind.
International Harvester Co., Chicago, Ill.
Lauth-Juergens Motor Car Co., Fremont, O.
National Motor Truck Co., Bay City, Mich.
Packard Motor Car Co., Detroit, Mich.
D. F. Poyer & Co., Menominee, Mich.
Alden-Sampson Mfg. Co., Detroit, Mich.
Sanford Motor Truck Co., Syracuse, N. Y.
A. O. Smith Co., Milwaukee, Wis.
White Co., Cleveland, O.

The above exhibitors will occupy all the space available on the first floor of the Coliseum Annex and First Regiment Armory, with the exception of two booths, and there are still six applicants who have not as yet secured space, as follows:

Mogul Motor Truck Co., Chicago, Ill.
Mercury Mfg. Co., Chicago, Ill.
H. J. Koehler, S. G. Co., New York.
Ideal Auto Co., Fort Wayne, Ind.
Kentucky Wagon Mfg. Co., Louisville, Ky.
Ware Motor Vehicle Co., St. Paul, Minn.

As there are likely to be a number of additional applications, it is quite probable that the basement of the Coliseum Annex will also be used, although this has never before been used for a commercial vehicle show. The second floor of the Annex will be occupied entirely by motor car parts and accessories; there will be no motorcycle exhibit.

TRADES MOST INTERESTED IN MOTOR TRUCKS

To what extent interest is taken in motor trucks and their use by different lines of business is a matter of conjecture. Probably the surest guide to this is the attendance at the big national commercial vehicle shows held annually in New York and Chicago.

A painstaking tabulation of all responses received to invitations to attend last winter's shows has been made by the statistical department of the N. A. A. M.

About 7,500 companies are included in the tabulation, making the most comprehensive investigation ever undertaken along this line.

The trades most prominently represented are as follows:

Building and contracting trades	482
Metal and hardware trades	392
Grocery trades	306
Machinery and tool trades	276
Light, heat and power companies	255
Dry goods and clothing trades	253
Furniture, beds and bedding, carpets, rugs and house furnishing	223
Brewing and liquor trade	219
Expressing, teaming, etc.	214
Coal and wood	205
Printing, publishing and allied trades	176
City governments	155
Lumber trades	151
Textiles and dyeing	143
Paints, oil and decorating trades	142
Heating, plumbing and steam fitting trades	126
Department stores	123
Storage and moving	117
Paper and paper box trades	111
Produce and commission	117
Steam railroads and equipment	112
Meat and packing trades	106
Boots, shoes, hats, gloves and men's furnishing	100

CLEVELAND AUTOMOBILE SHOW

Cleveland has been given first place on the circuit of local automobile shows, by agreement with the National Association of Automobile Manufacturers. The Cleveland Show will be held January 4th to 11th, before either the New York or Chicago Show.

The Cleveland management has secured the Wigmore Building, which is just being completed in that city, and which affords 63,000 feet of floor space. Some big individual exhibits are being figured on by Cleveland manufacturers for their home city. The display of commercial cars will be a great factor, with such resources at command, and accessory departments will be important factors in themselves.

DUNKIRK-FREDONIA TAXICAB COMPANY, of Fredonia, N. Y., Neal Hadden and J. B. Dunning, proprietors, have filed a voluntary bankruptcy petition. Liabilities $1498.30 and assets $430.50.

MOTOR RENTING COMPANY, New York City. Deputy Sheriff Porges has received a writ of seizure for nine automobile trucks in a suit brought against the company by the Dayton Auto Truck Company of Ohio to foreclose a lien of $18,304 on the trucks.

THE GRABOWSKY POWER WAGON COMPANY, which has been operated for the past year under the direction of a creditors' committee, has been petitioned into involuntary bankruptcy by the Gillespie Auto Sales Company and other creditors. The Security Trust Company has been appointed receiver.

COMMERCIAL CAR AGENCIES WANTED BY:

P. E. Corkran, Easton, Maryland, wants line of trucks from small cars up to four or five-ton trucks; also, small capacity worm drive truck.

Nelson V. Porter, Norwich, Conn., wants trucks selling from $500 to $1500.

N. V. & H. N. Porter, of New London, Conn., wants agency for cars listing from $500 to $1500.

South Side Motor Company, of 114 East 1st Street, Oil City, Pa., wants gasoline commercial cars of 1000 to 2000 lbs. capacity, selling at $1000 and up.

Sutton-Miller Company, Incorporated, Sixth Street, Indiana, Ia., wants cars of one and one-half and two-ton capacity, to sell from $1800 to $2500.

E. C. Meier, Manayon Street and Reading Railway, Phoenixville, Pa., wants cars of 800 lbs. to one-ton capacity, selling at $600 to $1800.

Albion Garage, South Main Street, Albion, Pa., wants agency for commercial cars of 1500 to 2000 lbs. capacity, to sell up to $1200. Address A. W. Sergeant.

A. L. Russell, Midway, Washington County, Pa., wants gasoline cars of two, three and five-tons capacity, to sell at various figures.

J. W. Hersey, South Main Street, Hardwick, Vermont, wants cars of 1500 lbs. capacity, to sell at $600 to $800.

Carr & De Zutter, 4 South Avenue, Williamson, N. Y., want gasoline cars of one to five-ton capacities.

Superior Motor Garage Company, 210 West 76th Street, New York City, want commercial cars of various capacities and prices.

Mansfield Garage, 64-66 North Walnut Street, Mansfield, Ohio, wants gasoline commercial cars of 1000 to 4000 lbs. capacity.

Woodbury's Garage, Springfield, Vt., proprietor, A. C. Woodbury, wants gasoline cars of 1000 lbs. to three tons capacity, to sell at $750 to $2500.

J. Mason Custer, 320 Collingdale Avenue, Collingdale, Pa., wants agency for cars of one-half to one-ton capacity. Selling price, $1000 or less.

Lake Street Auto Company, Lake Street, South Fork, Pa., A. J. Oaks, president, wants gasoline and electric cars of all sizes.

Thos. J. Byrne, 11 Evelyn Street, Rutland, Vt. Gasoline and electric cars of one-ton and up. Gasoline cars with four-cylinder motors.

H. J. Williams, 607 Centre Street, Ashland Pa., wants gasoline cars of 1000 to 2000 lbs. capacity, four-cylinder, water-cooled motors; selling price, $1100 to $1200.

McKenzie & Monroe, Honea Path, S. C., wants gasoline commercial cars of 1000 lbs. to three tons capacity, to sell at $600 to $1500.

The McComb Garage, McComb, Ohio, wants gasoline and electric cars of one-half, one and one and one-half-ton capacity, to sell at $800 and up. Address F. S. Pendleton.

Graphic Cycle & Auto Works, Main Street, West Hampton Beach, Long Island, want gasoline and electric cars of 1500 lbs., one and one-half and two tons capacity to sell at $750 up to $2000.

J. S. Waite & Company, 222 Main Street, Lock Haven, Pa., want cars of various capacities and prices.

Gabriel Bozer, 1007 Center Street, Ashland, Pa., wants commercial cars of 1000 to 2000 lbs. capacity.

Will L. Krise, 32-34 William Street, Pittston, Pa., wants one and two-ton cars, to sell at $1800 to $2500.

Gawthrop & Wister, Broad and Race Streets, Philadelphia, Pa., want gasoline commercial cars of 1500 to 2000 lbs. capacity, to sell at $1400 complete.

George H. Kilker, P. O. Box 291, Sturgis, So. Dak., wants gasoline cars of one to two tons capacity, to sell at $1500 to $2000.

Robert Snow, of 133 Mellen Street, Phoebus, Va., wants gasoline cars, at $2000 and less.

Commercial Truck Company, 19th Street and Pacific Avenue, Tacoma, Wash., wants one to ten-ton trucks, gasoline and electric.

Poultney Auto & Machinery Company, 3 Granville Street, Poultney, Vt., wants one-ton gasoline cars to sell at $750 to $1000.

John C. Irvin, Allegheny Street, Jersey Shore, Pa., wants cars of various sizes.

Thornhill Auto Company, 134 No. Mission Street, Wenatchee, Wash. Cars of all sizes and prices.

Fred. J. Rogers, Crandon, Wis., wants gasoline cars of 1,000 to 2000 lbs. capacities, selling at $1000 to $2000.

Austin's Garage, Sola, Wis., want gasoline cars of one and two-ton capacities, selling at $1000 to $2000.

Reliance Truck & Garage Company, 111-115 E. Lynn Street, Columbus, Ohio, wants gasoline cars, 750 and 1500 lbs. capacity, selling at $800 to $900 and $1250 to $1300.

Olewine's Garage, Hazleton, Pa., wants one-ton gasoline cars to sell at $1000 to $1500.

Otto J. Wilson, 288 Commercial Street, Salem, Oregon, wants cars of various capacities and prices.

Electric Vehicle Company, 1017 N. Broadway, Oklahoma, Okla., wants electric cars of 700 to 1000 lbs. capacity, to sell at various prices.

Auto Tire Company, 905 Shipley Street, Wilmington, Del., wants one to five-ton gasoline and electric cars.

Peters Machine Works, Kelso, Wash., Chas. A. Peters, proprietor, wants gasoline cars 1000 to 1500 lbs. capacity, to sell at $1000 and under.

Jackson Boulevard Garage Company, 1303-7 Jackson Blvd., Chicago, Ill., wants gasoline and electric cars of 1000 lbs. to three tons capacity.

Goldsmith Brothers, Harlan, Ind., want gasoline and electric cars of one to two tons, to sell at $1600 and under.

A. C. Taylor, 125 Church Street, Kewanee, Ill., wants cars of all sizes and prices.

Lawrence Bros., Plymouth, Ind., want gasoline and electric cars 1500 to 2000 lbs. capacity.

Locke Auto Company, J. W. Locke, 326 Upper Third Street, Evansville, Ind., wants gasoline and electric cars of various prices.

Auto Sales Company, 53-61 Main Street, New Britain, Conn., wants gasoline cars of 500 to 1500 lbs. capacity, to sell at $500 to $1000. R. F. Styles, purchasing agent.

L. A. Holthouse, cor. 1st, 2nd and Jackson Streets, Decatur, Ind., wants gasoline commercial cars of one-half to two tons capacity.

F. A. Rhodes, 429 West 124th Street, New York City, wants 800 lbs. to one and one-half-ton gasoline commercial cars, to sell at $850 to $2000.

Frank A. Plansky, 627 North Fifth Street, Manitowoc, Wis., wants gasoline cars of one to three tons capacity.

Coalinga Auto Stage Company, Coalinga, Cal., wants electric cars of one or one and one-half tons; write to H. L. Jessen.

A. A. Marvin & Son, of Maple Park, Ill., want gasoline cars of 1000 or 2000 lbs. capacity, to sell at $1200 or under.

Arthur Allwood, Jr., Blossoms Avenue, Fall River, Mass., wants gasoline commercial cars of 500 lbs. to one ton capacity, to sell at $750.

Shelbyville Garage and Repair Company, 708 Main Street, Shelbyville, Ky., wants gasoline and commercial cars of one-half to three tons capacity, to sell at $800 to $2000.

C. A. Dixon, 1141 East 14th Street, Oakland, Cal., wants gasoline commercial cars of three to five tons capacity, to sell at $2000 to $5000.

Donaldson Brothers, Milford, Ia., wants gasoline cars of 1000 lbs. to two tons capacity, to sell at $1000 to $2500.

Wm. F. Pohler, George Street, Batesville, Ind., wants commercial cars of various sizes and prices.

Note.—Inquiries of the above character will be inserted for our subscribers without charge of any kind.

This service, however, is only for subscribers and those wishing to take advantage of it and who are not subscribers, should send their subscription order and remittance with the necessary data for the notice. *Advertisement.*

COMMERCIAL CAR EXPORTS

The new subdivision of the Department of Commerce and Labor, known as the Bureau of Foreign and Domestic Commerce, has issued its first monthly statement, in which the automobile exports business is given considerable prominence. The report covers the month of July, 1912, and divides the exports of automobiles into commercial and passenger classes, showing the growing importance of the commercial branch of the trade. During the month of July 78 commercial cars were exported, having an aggregate value of $156,458, or an average of about $2000 each. The establishment of this sub division will soon give us figures by which we will be able to compare the relative growth of exports of commercial cars with that of pleasure cars.

THE COMMERCIAL CAR JOURNAL

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JAMES ARTMAN.....Editor-in-Chief
E. S. FOLJAMBE.....Managing Editor
WM. J. JOHNSON.....Traveling Editorial Representative

ASSOCIATE EDITORS

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SUBSCRIPTION RATES

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Entered as second-class matter at the Post Office at Philadelphia, Pa. under the Act of March 3, 1879.

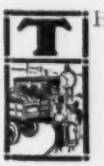
The 1912 Table of Specifications of Commercial Cars will be included in the regular subscription price of $2.00 per year for the Commercial Car Journal until the supply on hand is exhausted.

NO INDICATIONS THAT TRUCK MAKERS WILL BECOME SPECIALISTS

IT has been suggested in the daily papers and elsewhere that the motor truck makers will soon be specialists and build for one line of trade exclusively. Although like everything else, there is a grain of truth in this, we do not believe that such a condition will materialize to any great extent.

Makers will doubtless specialize on fire apparatus, or perhaps on peculiar tractors, or street cleaning devices, but it is believed the makers will cater individually for all general lines, supplying special bodies or whatever is necessary for machines going into particular trade work. It is not true that particular or peculiar chasses are necessary for nearly every different industry; exactly the opposite is true. The standard chassis of most makers can very readily be adapted for work in almost any kind of business, and the whole problem resolves itself into one of body building. It is the body builders who will become specialists, one confining his attention to highly specialized dumping bodies, while another specializes on enclosed or panel work, etc. We do not believe there is any general tendency on the part of the truck makers to specialize.

WILL THERE BE A SHORTAGE ON LARGE TRUCKS FOR 1913?



THE remarkable increase in the number of trucks which will be built in 1913 as compared to 1912, would indicate anything but a shortage this coming season. The figures show that there were some 34,000 trucks made in 1912, and 45,000 to 50,000 are to be built this coming year. The largest increases, however, are confined almost entirely to the small vehicles, 750 to 800-lb. wagons showing the largest, closely followed by the 1500 to 1600-lb. machines, and the 1000 and 2000-lb. trucks. About the same increase is also shown in the 3000-lb. trucks.

In the larger sizes the increase is not so marked, the 3-ton and 5-ton being the only ones, the production of which has been increased to any great extent. In spite of an increase from 34,000 to 45,000 or 50,000, there is a feeling in the trade that there is likely to be a shortage on the larger sizes, such as the 3 1-2 ton and 5-ton models.

There has been steadily growing a strong demand in favor of motor transportation among all classes of business men. They have been watching carefully and investigating as far as possible what the other fellow is doing with trucks. These men have simply been waiting to know whether the motor driven vehicle for heavy hauling is practical. The reports from all sources show that the vehicles can and do operate more economically in almost every kind of work than horses, and that they stand up when properly handled under the most adverse conditions of weather and roads, and that they are as dependable as the street cars and railroad trains, or other means of locomotion. All these facts are being noted by the conservative business man, and the time is not far distant when he will suddenly make up his mind to purchase.

This process has been going on quqietly but steadily for several years, and we believe the conviction will come home to thousands and thousands of these men at about the same time. If it takes place this year it will mean that there will be a decided shortage of 3 1-2 and 5-ton models. Our letters of inquiry in regard to the trucks which are in use, show an enormous percentage of companies who have just purchased within from two to five months. Nearly all of these are users of large trucks, and this we feel is an indication that the business man is at last awakening to the advantages of motor transportation. When it comes, the demand will come with a rush, which will unquestionably swamp the makers of large size trucks, who are building conservatively. Within a year, practically all of these new users will have been convinced, and in their increased delivery requirements alone will cause an enormous increase in demand. In the meantime, thousands of other firms are just ready to buy, and when they swing into line the large number of small sized trucks will not be exactly what is desired. Many of these firms will doubtless buy several small-sized machines where larger units would ordinarily be purchased, if it is found that the larger sizes cannot be had.

To sum up, we might say that there is a tendency on the part of the makers to enormously increase the production of 800-lb., 1000-lb., 1500-lb. and 3000-lb. machines, but that the proposed increase in 3 1-2 and 5-ton models will not be sufficient to care for the demand, thereby causing a shortage on these large sizes.

The Steel and Rubber Markets

Owing to the growing importance of the market prices of both steel and rubber to the automobile trade, a review of the market price of these commodities will hereafter be a regular feature of the CCJ.

THE STEEL MARKET

The unfilled steel orders increased over 1,000,000 tons in October, the United States Steel Corporation's business being the greatest in the history of that concern. Orders were received for 2,142,000 tons, exceeding shipments by 1,042,874 tons —total unfilled tonnage 7,594,381 tons. The production for the month was 1,620,000 tons of ingots and 1,213,000 tons of finished products. These figures establish a new high record of production. Other companies, such as the Republic Iron & Steel Company and Pennsylvania Steel Company and others report record breaking production during October.

Orders from railroad and car building companies are pouring in in constantly increasing numbers and size and the greatly increased demands of the automobile trade is also a factor in the market. Steel prices continue strong and are likely to go still higher.

RUBBER AGAIN ON THE DECLINE

The steady decline in rubber which has taken place during the past few months, was temporarily checked in the early days of this month, but the downward tendency is again apparent.

On November 12th in London the offerings were apparently freer and the tendency of both the Brazilian and the plantation grades was downward. At the close up-river fine was cabled at 4s 5d and up-river coarse at 3s 4¾d. These prices were unchanged to 1d lower for the day. First latex pale crepe closed at 4s 2½d, or 1d lower than at the close on Saturday.

In New York the market, despite the absence of any important demand and the recession in London, appeared to be steady, and jobbing transactions were reported on the basis of $1.04 for up-river fine.

Up-River—				**African—**			
Fine	1 04	a	..	Massai red	95	a	96
Coarse	80	a	..	Red Congo	95	a	96
Island, fine	97	a	98	Black Congo	94	a1	00
Coarse	52	a	53	**Soudan—**			
Cameta	56	a	..	Niggers	86	a	..
Caucho—				Accra, l'ps	45	a	..
Ball	89	a	..	Ball	80	a	..
Centrals				Gambia, prime	66	a	67
Corinto	78	a	..	**East India—**			
Esmeralda	77	a	..	Smk. shorts	1 04	a1	05
Guatemala, slab	54	a	55	Ceylon, bis. and sh'ts	99	a	..
Mexican—				Pale crepe	1 02	a1	03
Scrap	79	a	..	Borneo I	62	a	63
Strip and scrap	77	a	78	Borneo II	50	a	52
Guayule	Nominal			Borneo III	42	a	..
Balata, sh't	76	a	..	Pontianac,			
Ciudad, bl'k	53	a	..	Prime plantation	7	a	..
Trinidad, bl'k	Nominal			Palambang	7	a	..

SCRAP RUBBER

Tires—	
Automobile	9¾a10
Bicycle pneumatic	5¼a 5½
Wagon and carriage, solid	9¼a 9¾

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	28 00 a 28 50
Open hearth, per ton, mill	28 00 a 29 00
Sheet bars, per ton	29 00 a 30 00

STEEL BARS

Steel, soft base, half ex., tidewater ..... 1 56 a 1 61

The above prices are at tidewater in carloads and larger lots For quantities less than 2,000 lbs., and more than 1,000 lbs., $2.50 per ton additional is charged, and less than 1,000 lbs., $8.00 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over, f. o. b. mill; smaller lots $2.00 per ton higher.

Gauge—	Black	Galv.	Gauge—	Black	Galv.
Nos. 22 & 24	2 10	3 05	No. 28	2 25	3 40
Nos. 25 & 26	2 15	3 15	No. 29	2 30	3 60
No. 27	2 20	3 25	No. 30	2 35	3 80

CONVENTIONS OF THE NEAR FUTURE

The list of conventions given below is to be published each month so that commercial car manufacturers can communicate with the proper authorities with the idea of arranging to give lectures, illustrated talks, statistics, etc., to show the advantage of motor trucks in these various lines, also possibly to show and demonstrate their cars.

November 19-20—Kansas Agricultural and Industrial Congress, Convention Hall, Hutchinson, Kansas. John Lovett, Asst. Secretary.

November 19-21—National Federation of Retail Merchants of the U. S. will convene at St. Louis, Mo., at the Planters Hotel. J. R. Moorehead, of Lexington, Mo., is secretary.

November 19-21—Michigan Retail Implement and Vehicle Dealers' Association, of which F. F. Witbeck, of Lansing, is Secretary, will convene in Saginaw, Mich. Sessions to be held in the Auditorium.

November 19-21—National Convention of Ice Cream Manufacturers will hold National Convention in Dallas, Tex.

November 19-22—Minnesota Conservation and Agricultural Congress, Minneapolis, Minn.

November 21—Central Electric Railway Association Convention, Columbus, Ohio.

November 25-28—15th Annual Session of American Mining Congress, Spokane, Wash. J. F. Callbreath, Denver, Col., Secretary.

November 29-30—Southern Textile Association will convene in Chattanooga, Tenn., in the Chamber of Commerce Bldg.

December 3-5—Oklahoma Hardware and Implement Association Convention, Oklahoma City, Okla. W. B. Porch, Secretary.

December 3-6—Maine Dairymen's Association will hold annual convention in Portland, Maine. Leon S. Merrill, of Orono, Maine, is the secretary.

December 3-6—American Road Builders' Association Annual Convention, Music Hall, Cincinnati, O. E. L. Powers, 150 Nassau St., New York City, Secretary.

December 10-12—The Retail Implement Dealers' Association, of South Dakota, Southwestern Minnesota and Northern Iowa, will convene in Sioux Falls, S. D.

December 10-13—New York Dairymen's Association will hold convention in State Armory, at Syracuse, N. Y.

December 12-18—National Association of Cement Users' Annual Convention, Pittsburgh, Pa. R. L. Humphrey, Harrison Bldg., Phila., Pa., is President.

January 9-10—Idaho Retail Hardware & Implement Dealers' Association will convene at Boise, Idaho. H. M. Haudm is Secretary.

January 9-11—Forty-ninth Annual Convention of the National Wool Growers' Association, Cheyenne, Wyo.

January 14-16—The Tri-State Grain Growers' Association's next Annual Convention, Fargo, N. D.

January 21-23—Ohio Association of Retail Lumber Dealers' Association will convene in Cleveland, O.

January 21 to 24—Wisconsin Retail Hardware Association Convention at Milwaukee, Wis. Geo. W. Kornely, 806 Third Street, is Secretary.

January 22-24—Southwestern Lumbermen's Association will hold Convention in Kansas City, Mo.

January 28-30—Illinois Master Plumbers' Association will convene in Chicago, Ill. W. K. Hilliard, of Elmhurst, Ill., is President.

February 11-13—Annual Convention of the Texas Hardware & Implement Association, Dallas, Tex.

February 12-14—Second Annual Convention of the Buttermakers' Association at Cedar Rapids, Iowa. J. J. Brunning, of Strawberry Point, is Secretary.

February 18-20—Kentucky Retail Hardware and Stove Dealers' Association Convention, Galt House, Louisville, Ky. J. M. Stone, Sturgis, Ky., is Secretary.

February 18-21—Minnesota Retail Hardware Association will convene at St. Paul, Minn., exhibition to be held at St. Paul Auditorium. Thos. G. McCracken, Metropolitan Life Bldg., Minneapolis, is Secretary.

February 18-21—New York State Hardware Association will hold eleventh annual convention in the new Broadway Convention Hall, Buffalo, N. Y. La Fayette Hotel will be convention headquarters.

February 20-28—Ohio State Retail Hardware Merchants' Association Convention, Sunday's Tabernacle, Columbus, O. J. Y. Bassell, Secretary, Chamber of Commerce, is in charge of arrangements.

February 25-28—Fifteenth Annual Convention of the Iowa Retail Hardware Association, to be held in the Des Moines Coliseum, Des Moines, Iowa.

May 27-29—National District Heating Association will hold 1913 Convention at Indianapolis, Ind. R. D. DeWolf, of Rochester, N. Y., is President, and D. L. Gaskill, of Greenville, O., is Secretary and Treasurer of the Executive Committee.

June 10-12—The American Steel and Hardware Association will convene at Buffalo, N. Y. Harry Saunders, of the Chamber of Commerce, is Secretary of the committee in charge of preparations.

ELECTRIC VEHICLE ASSOCIATION OF AMERICA will shortly establish a permanent office in New York for the purpose of inaugurating an educational campaign on the utility of electric power for trucks and pleasure cars.

INFORMATION BUREAU

WHAT WOULD YOU LIKE TO KNOW? FREE SERVICE

There are many important questions about commercial cars, or their use or care, upon which we feel sure our readers would like to be more fully advised.

Write us stating fully what you want to know.

Address Information Bureau,

COMMERCIAL CAR JOURNAL, Market & 49th Sts., Phila., Pa.

EXPLANATION OF OPERATING COSTS DESIRED

[222] I would like further information regarding the figures given on page 47 of the September issue, under "Actual Cost Figures of Five Tons, Etc." The particular items are the cost per ton mile of .119 and cost of handling a ton .545. In these figures are given average miles per day 30.42, average stops per day 19.37, total cost per mile .387, and tonnage per day 21.63. If his total daily mileage is 30.42, it is fair to assume that only one-half of this or 15.21 was covered with a load.

Now if the daily stops were 19.37 then 15.21 divided by 19.37 equals .785 is the distance between stops. Without definite figures, I must assume that the average tonnage taken off at each stop is the same. Now if we multiply the daily tonnage by the distance between stops, we get the actual ton mileage. This would be .785 x 21.63 equals 16.98 ton miles per day. Multiplying the daily mileage by cost per mile gives 30.42 x .387 equals 11.77. This divided by the ton miles per day gives 11.77 divided by 16.98 equals .693 cost per ton mile as against their .119. You will notice that this is fairly close to the sum of their cost per ton mile and cost of handle a ton, i. e.; .545 plus .119 equals .664. They evidently have arrived at their ton mile cost by dividing cost per mile by average load, .387 divided by 3¼. This would be correct if the truck carried 3¼ tons for every mile it traveled, but it is a fair assumption that it does not.

What is meant by cost of handling a ton? If this is a terminal charge, it is rather misleading and should not be included in the truck cost, as this charge would appear whether the goods were delivered or not. Again it would appear that their depreciation charge is not enough—only a trifle over 6 per cent. If this charge is enough for the first year, then it should be at least 20 per cent. the second year, and 35 per cent. the third, in which case their cost of operation would run up each year.

FORTY-FORT, PA. W. S. FANNING.

Were the truck mentioned in your inquiry used in the haulage of general merchandise, your deductions would be nearly correct, but the brewery business differs considerably from other lines and for that reason the matter has been referred to an authority on motor transportation who states as follows: "Unlike general mercantile trucks, those owned by brewers, rarely, if ever, travel without some load, either filled barrels or cases, or the empties, and the estimated average load of 3½ tons would be a trifle under rather than over that of a five-ton truck at all times. The practice of constantly overloading is strong in the brewery business and a full load would run nearly six tons as a regular thing. The operating figures as printed are about right and the only item which would seem open to criticism is that of depreciation as touched upon in your letter. This is a subject upon which very few agree, but the best practice when considering the product of the leading manufacturers, would assume as a basis for compilation, a supposed life of from 100,000 to 125,000 miles for the vehicle and charge off at so much per mile, deducting, however, from the original price of the truck the cost of tires and an estimated amount of new material renewed each year. In our larger cities, however, this method of figuring depreciation would not answer in the brewery line, as the labor question affect the drivers to a greater extent than in any field the motor truck has entered. Many representatives will not sell to the brewery trade in New York, Chicago, Cincinnati, etc., and on account of the lack of intelligent operation and care, a more reasonable method of treating the depreciation question would be to charge off at a flat rate of not less than 20 per cent. The item of 'cost per ton to handle—.545,' is a terminal charge and should not be included in the ton mile cost of the motor truck; all work of loading and unloading while on the road is performed by the driver and his helper, charge for which is included in the first part of the article. The table shown is evidently based upon carefully compiled records and not the result of guess work, as is so often the case.—EDITOR.

GARAGE CHARGES FOR ELECTRIC TRUCKS AND EXTENT OF USE OF MACHINES IN NEW YORK

[223] The statement was made, that there were less trucks in use in New York City today than two years ago. This sentiment seems to prevail with the transfer men here. How about it?

Can you give me any information regarding two or three of the transfer men in New York as to the success of the gas or electric trucks in their business? Conflicting stories seem to be floating about, and are hampering progress in the development of the truck business locally in the transfer line.

Are there any Railroads in the U. S. that have separate openings for motor trucks for the receipt or discharge of freight?

MINNEAPOLIS, MINN. PENCE AUTOMOBILE CO.

The statement that motor trucks are losing ground in New York is very far from the fact as two years ago there were 2500 machines in the city, and the registrations of trucks up to July 1st of this year showed 4100 in use; while possibly not to such a large extent, the same conditions exist in all places where the power vehicles have been introduced.

Transfer companies, and by that term we believe you mean baggage and express companies, in New York are among the largest buyers of the self-propelled vehicle, and such concerns as Adams, American, Wells-Fargo, Wescott, United States, Monahan Dodds and other express companies are rapidly becoming motorized to the total exclusion of the horse. It is quite the regular thing for truck makers to receive orders for from fifteen to twenty-five trucks at a time from any one of these concerns. We know of no railroad having exclusive platforms for the motor truck, though much thought is being given the subject by transportation companies and organizations, such as the Motor Truck Club of New York.

Effect of the Parcels Post on the Country Merchant

Commercial Cars to the Rescue---An Opportunity for the Agent and Manufacturer

BY E. S. FOLJAMBE

ITH the advent of the Parcels Post, momentous changes are bound to take place in the delivery of at least light weight goods in many different kinds of business throughout the country. The delivery by mail at extremely reasonable rates, of packages and parcels up to eleven pounds in weight, and in size not greater than 72 in. in length and girth combined and of a form and kind which will not injure the person of any postal employee, or damage the mail equipment or other mail matter, and not of a character perishable within a period reasonably required for transportation and delivery, throws open the door upon a new era of delivery. This will enable manufacturers and those who sell a large variety of small articles to send these goods quickly and cheaply to their destination, thus making it possible for them to deliver to even distant points free of charge to their clientele.

The Country Merchant and Mail-Order House

There is one class of business which will be enormously benefited by the new arrangement, and to the same extent that it is benefited, the small merchant, especially in country districts, will be damaged. Mail order houses are already making it difficult for the country merchant to exist. Competition is gradually being stifled, and the modern octopus, which already has its tentacles around the heart of the merchants of almost all rural districts, will now, by means of the Parcels Post, be enabled to complete its work of destruction, unless some way is devised to prevent it. The mail order houses have gradually established subsidiary factories and distributing centers from which goods are shipped direct to points in the territory surrounding, and undoubtedly this system will be extended, as most advantageous rates can be had, for with such auxiliary shipping points, a large part of the shipments will be confined within what is designated in the new postal laws, as the first, or at most, the second zone. The first embraces an area having a radial distance of approximately fifty miles from the center. Within this zone the charge will be five cents for the first pound or fraction of a pound and three cents for each additional pound or fraction of a pound. The second zone includes all units of area outside of the first zone, lying in whole or in part within a radius of approximately 150 miles from the center of a given unit. Delivery within this zone can be had for six cents for the first pound or fraction thereof, and four cents for each additional pound or fraction of a pound. Eight zones are provided for, the latter including all territory outside of a radius of 1,800 miles, the rates in the intermediate zones increasing one cent per lb. up to and including the seventh zone; and a special rate of twelve cents the first pound and twelve cents for each additional pound is made between the Philippine Islands and any portion of the United States. With this service in operation, and with properly located sub-centers, the mail order houses will be able to offer entirely free of charge for delivery, a large part of the goods which they handle.

Inadequate Delivery Service of Small Merchant

The small merchant at best has but meager and inadequate delivery facilities. It is utterly hopeless for him under present conditions to attempt to meet the competition of the mail order houses, to say nothing of meeting it after the Parcels Post is established. Something must be done to equalize conditions, making possible that unhampered and wholesome competition which is the safeguard of prices, and the life of trade. To whom are the small merchants to look for help? Naturally to themselves, but how? Without better delivery methods it is almost hopeless for them to attempt to meet this uneven competition. The answer is—the commercial car! It alone offers the means of better delivery, and it alone can save the day for the small merchant. How? By supplying the means of quick delivery of goods to meet the competition of the mail order houses and their use of the Parcels Post. Not manufacturing any of his own goods and being obliged to purchase in small quantities at relatively high prices, the small merchant can't afford to send goods by Parcels Post. The mail order houses on the other hand, on account of the low purchase or manufacturing price, due to quantity production and absence of retail establishment expenses, can well afford to send by Parcels Post.

Individually, small merchants can do very little, as few of them are able to support an adequate horse delivery service, but by a co-operative service great results can be accomplished. In fact, it is not saying too much when we voice the sentiment that it is possible to organize and so conduct a co-operative delivery system of the merchants in the smaller cities, that they can deliver goods entirely free of charge to their customers, within a radius of 80 miles and more and even without expense to themselves.

A Suggested Co-operative System

In order to carry to a successful conclusion any co-operative association, there must be a leading spirit back of the combination. This important factor can and should be furnished by the manufacturers and dealers of motor driven trucks. Here is their opportunity to put into service large numbers of delivery vehicles, and give thereby a new lease of life to the small merchant. The co-operative association

could be helped into being by the efforts of local manufacturers' or dealers' associations, or by one or two of the most prominent commercial car dealers where no organization of dealers exists. Fifty or even one hundred of the merchants in the locality should be induced to subscribe amounts, based on the number of parcels and the character of delivery service each would receive from the co-operative association. In this way the cost to each member of the association would be comparatively small, as a limited number of motor driven vehicles operated on the co-operative basis would be ample for all delivery needs. These cars could easily cover a territory of say sixty miles in radius, with special arrangements for points one hundred miles distant, and would supply each of the members a delivery far superior to anything previously operated by them as individuals, and even in their territory superior to the Parcels Post. Rates should be based on the number of packages delivered, there being a charge of five or six cents per package up to 20 lbs. in weight, and a special rate for bulky or heavy articles.

How This Delivery System Can Be Maintained Without Expense

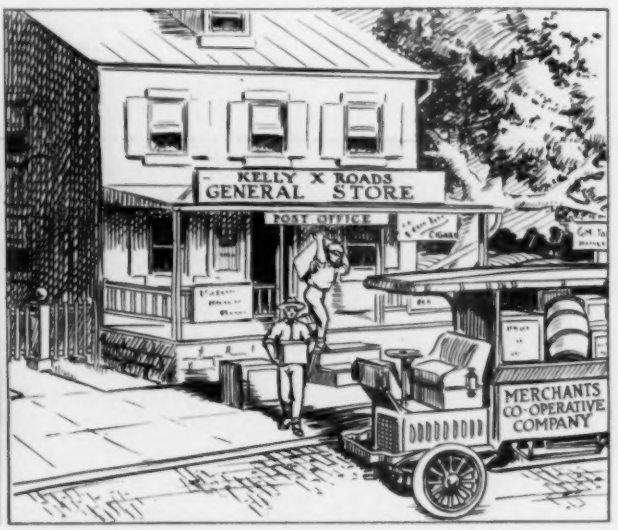
In order to secure the undivided support and co-operation of all the small merchants, this delivery system and the benefits to be derived from it must be furnished at the minimum of expense. At first sight it may be looked upon as too much of an undertaking for a number of small merchants, but we herewith suggest a method of producing revenue, which, if properly handled, should totally eliminate all expense of delivery to the merchants concerned. In railroad practice it is well known that the empty train is the monster which consumes, without ceasing, the profits. The same is literally true of commercial cars. The remedy is therefore easy. Keep the cars loaded. It is natural to ask, how is this to be done, as the trucks must return from far distant points to the co-operative center or garage after delivering their loads. Here is exactly where the operating company of a co-operative system can make money to offset the cost of delivery. The trucks should never be allowed to return empty. In any such territory, that is, within a radius of one hundred miles of most towns or cities, there are large numbers of farmers, truck gardeners, and produce farmers, whose goods have to be delivered to the city; exactly the place to which the empty trucks are returning. Therefore, what is more natural than to co-operate with the farmers and truck gardeners by supplying them with a return delivery service to the city. An arrangement could be effected, so that it would be unusual indeed for any of the co-operative trucks to be run light. With loads both going and coming, the maximum efficiency of the vehicles could be maintained, and even at prices to the farmers which they themselves could not meet, and even lower than the Parcels Post, a profit could be shown by the co-operative vehicles.

Take for instance a case: suppose that in a community there were thirty merchants who have joined such a co-operative movement. These merchants probably do not maintain all told, over sixty horse wagons, some of them perhaps being without any regular means of delivery. Sixteen to twenty trucks operated on the co-operative basis could do the same work. These machines purchased in a single order from a manufacturer could be bought at the fleet price, at an initial expense of probably not over $35,000. The cost to each of the members if equally assessed would average slightly over a thousand dollars. The smaller merchants, however, would not be required to put in but a few hundred dollars, while the large ones would shoulder the responsibility according to the amount of delivery service used.

Separate Business Organization

The officers of the co-operative delivery company could be elected from members of the firms forming the association, and those in actual charge of the vehicles could be hired by the combination. By such a community of interest delivery system, each merchant could be cared for in a better way than ever before. The business represented by the return trip hauling could be conducted independently. There should be no trouble in obtaining this business, as many farmers and outside produce men would be glad of the opportunity of securing early delivery by motor truck, especially if this could be had at a reasonable figure. Such a service would eliminate crating and shipping by railroad with its attendant delays, de-

Some of These Merchants Are Without Any Regular Means of Delivery



By Such a Community of Interest Delivery System, Each Merchant Could Be Cared For in a Better Way Than Ever Before

terioration and loss on perishable goods. The present method of hauling to a local railroad station, and leaving goods to stand unknown lengths of time on the platform before shipment, and the same again at the other end of the line, reaching their destination the following day, would all be changed. The goods would be loaded at once directly on the truck, and reach their destination the afternoon of the same day. With milk it is even a much more serious matter to let it stand on a railroad platform and warm up in the sun, which often happens even when it is to be shipped but a few miles into the city.

Night Lay-Overs

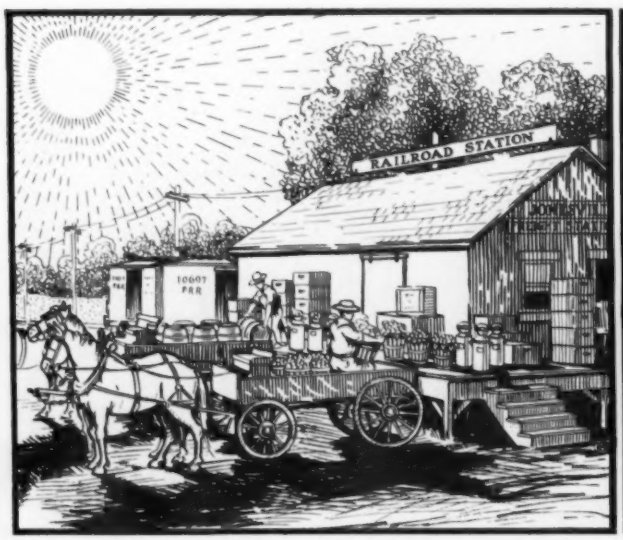
It is further suggested that the machines on the long 80 or 100 mile routes, might be housed at one of the points where a large shipment of produce or other material going cityward had to be taken on in the morning. An arrangement could easily be effected so that the trucks would be on their return very early in the morning, and having delivered their load in the city by noon, would be ready for their afternoon delivery on a short route.

If properly conducted, such an arrangement would prove very advantageous to all of the merchants concerned, and owing to the return haul feature, the actual cost to each of the members of the association should be very small. A co-operative garage could very readily be planned, so that it could care for a certain per cent. of outside work, which again would help to defray the expenses of caring for the trucks. The repair department under its competent head could not only care for the association's vehicles, but could do a profitable business in repairing transients. In small cities such a co-operative garage would undoubtedly have more up-to-date facilities and better accommodation than the average, and patronage would therefore be easily obtained.

Progress Due to Such Co-operative Associations

It can easily be conceived that the introduction of such a co-operative system into most small towns would have a wonderfully livening effect on the entire community. Other business houses would realize the importance of up-to-date methods, and would either join the association, or would gradually be succeeded by those firms employing more progressive methods. The use of motor driven vehicles by the leading business houses would insure their heartiest support for good roads, proper pavements, and the generally improved conditions which follow as naturally in the wake of the motor truck, as water follows the finger down a window pane. The farmers in the outlying districts would also be enlisted in the good roads movement, and it would be but a few years until all the arteries leading from the heart, or center of the business section, not only to the residential sections, but to all points within the one hundred mile radius, would be improved, and eventually become real roads suitable for economical motor transportation of merchandise. This cannot now be said of the roads of many of our smaller cities and rural communities.

There would naturally follow to a certain extent a co-operation on the part of the farmers, as it would be such a simple easy matter for them to obtain goods from the merchants in the combination, owing to the fact that the trucks are calling at their places regularly for return goods. Their sympathies would be enlisted for the success of the undertaking, as its success would mean to them a continuation of the quick and economical transportation of their goods to the city. Under these conditions their trade would naturally go to their own community, even if they were able to obtain goods from mail order houses or elsewhere at the same prices.

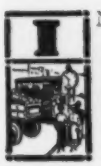


With Milk it is a Serious Matter to Let it Stand on a Platform and Warm Up in the Sun

The Goods, Loaded at Once Directly on the Truck, Would Reach Their Destination the Afternoon of the Same Day

Any driver with horse sense can understand horse power as now applied to commercial cars

Notes On the Cost of Motor Trucking*



N May, 1911, the Electrical Engineering Department of the Massachusetts Institute of Technology was enabled, through an appropriation of the Edison Electric Illuminating Company, of Boston, to undertake a study of the economics of motor truck operation. The work up to the present has been chiefly the collection of operating costs from a number of users of motor trucks in the eastern part of the country. Among the cities which have been visited and from which data have been collected are New York, Chicago, Boston, Philadelphia, Washington, St. Louis, Detroit and a number of smaller cities in the same territory.

Difficulties of Estimating Costs

Even from the best data available, however, it is a difficult problem to estimate what will be the cost of operation of a modern motor truck under any given set of conditions. If one bases his estimates upon records extending over four or five years or more, one is likely to estimate a number of the items too high, since the changes in construction in the last five years will undoubtedly reduce the cost of repairs, tires, batteries, etc., to a figure considerably below the cost of these items for the earlier types of cars. In addition, the method of handling motor trucks is better understood at present than it was in the early years of their use. Again, if one uses the figures obtained from records which extend back only a year or two, the estimate, unless a number of factors are allowed for, undoubtedly will be low. In particular, the annual cost of repairs on a car a year or two old will be much less than the average cost per year of this item over the life of the car.

Service and Road Conditions

In estimating the cost of performing a trucking service, it is imperative that the character of the service and also the physical conditions of the roads be given careful consideration. The diversity of conditions as represented by the data thus far collected is indicated in table, in which are listed the various reports from which quotations upon the several expense items are made. In addition to information upon the class of service, nature of roads, and nature of grades for each report, there are given in these tables data upon the number of trucks represented in the report, the age of the trucks at the time of the report, and the length of time covered by the report, and further upon the average number of miles traveled by each car and the days each car was used during the report period.

Tires

One of the most important items of the operation of a motor truck is the cost of tires, and to arrive at a figure for this item, neither the manufacturer's guarantee nor the book records of actual cost can be used without a knowledge of a number of other factors. The manufacturers' guarantees are usually based upon a stated maximum speed and stated load, together with a provision against other abuse of the tires. The users of cars, however, have no reliable check upon abuse of the car by the driver, with the result that when the tire fails to give the guaranteed mileage, there is a compromise between the user and the tire manufacturer, frequently resulting in the tire cost per mile being increased to a greater or less extent above what it would be on the basis of the manufacturer's guarantee.

Again, a tire cost of so much per mile as deduced from the book figures of the tire renewal account, cannot be accepted at its face value. For example, suppose that the car has run 14,000 miles in a year, and that but one set of tires besides those originally on the truck have been purchased in this period. If the tires are good for 8,000 miles, this would mean that at the end of the year the second set of tires were practically worn out, but the book record would give only the cost of one set of tires. Using such a record to determine the average cost of tires per year would evidently be misleading.

* From paper read by Harold Pender and H. F. Thomson before the Electric Vehicle Association of America at Boston on October 8-9, 1912.

Carrying Capacity (lbs.)	No. of Trucks	Age of Trucks in Months	Miles Traveled per Car	No. Days Ea. Car Used	CLASS OF SERVICE	NATURE OF ROADS	NATURE OF GRADES	Tire Ren'als		REPAIRS		Gasoline, Miles per Gallon	Lubricant Cost per Mile	Garage Expense per Car per Yr.	Sundries per Year	Depreciation Rate	INSURANCE		
								No. Months	Tire Renewal Cost	Total	Per Mile						Fire	Liability	Total
750	1	14	9,500	...	.....	Poor	Rolling	14	$217	$304	$.0320	12.25	.....	.....	.....	..	...	$76	$76
2,000	1	25	8,900	260	Miscellaneous	Good	Hilly	25	42	935	.1056	6.54	$0.42	$271	$15	33	...	.....	.....
3,000	1	24	16,300	550	Retail Delivery	Excellent	Rolling	23	1010	462	.0285	6.57	.....	.....	144	33	...	.....	.....
3,000	1	13	6,300	323	Trucking	Good	Hilly	13	163	107	.0169	6.24	.28	.....	.....	25	...	.....	125
4,000	1	39	22,600	765	Wholesale Delivery	Good	Flat	39	787	2050	.0908	3.59	.....	.....	81	..	...	53	53
6,000	1	48	8,000	254	Wholesale Delivery	Good	Flat	20	390	3040	.3800e	3.18	1.23	81	23	25	$30	100	130
6,000	1	23	13,000	550	Wholesale Delivery	Good	Flat	23	426	345	.0264	3.82	.41	.....	5	..	65	72	87
6,000	1	18	13,200	416	Wholesale Delivery	Good	Flat	18	618	1030	.0783	3.74	.63	.....	26	..	76	159	235
6,000	5	32	36,000	651	Express	Excellent	Rolling	32	1084	4130	.1147	.....	.75	459	9	..	...	.....	.....
6,000	1	42	19,700	...	Transfer	Excellent	Rolling	12	1052	2442	.1236	5.88	1.51	256	58	..	...	.....	.....
6,000	1	15	14,500	270	Wholesale Delivery	Excellent	Rolling	12	570	405	.0280	4.49	.61	289	15	20	...	.....	263
6,000	1	12	14,200	268	Wholesale Delivery	Excellent	Rolling	12	357	460	.0324	4.56	.57	.....	8	..	...	.....	229
8,000	1	20	8,500	405	Trucking	Poor	Flat	20	0	394	.0465	3.68	1.02	.....	12	..	92	69	161
6,000	1	12	11,500	...	Transfer	Good	Flat	12	625	16	.0014d	6.37	.77	.....	.....	10	...	220	220
6,000	1	18	13,100	425	Wholesale Delivery	Good	Flat	18	472	905	.0691	3.77	.....	.....	152	..	...	53	53
10,000	1	24	14,700	546	.....	.....	.....	24	1990	1250	.0851	3.68	1.20	.....	41	15	...	140	140
10,000	1	12	8,000	304	.....	.....	.. ..	12	893	692	.0867	3.70	.85	.....	66	..	...	140	140
10,000	1	12	8,000	302	.....	.....	.....	12	1181	515	.0637	3.69	.95	.....	77	..	...	140	140
10,000	1	12	11,700	294	Wholesale Delivery	Excellent	Rolling	12	941	410	.0349	4.65	1.01	.....	.....	10	...	.....	231
14,000	5	32	27,200	655	Wholesale Delivery	Good	Flat	32	2510	1505	.0555	2.60	.91	70	135	20	...	208	208

(a) No renewals during period covered by report. (e) New engine and transmission. (d) Machine not overhauled during period covered by report.

Condensed Table of Costs and Data—Gasoline Commercial Cars

Carrying Capacity (lbs.)	No. Trucks in Use	Age of Trucks in Months	Miles Traveled per Car	No. Days Ea. Car Used	CLASS OF SERVICE	NATURE OF ROADS	NATURE OF GRADES	Tire Renewals No. Months	Tire Renewals Total Cost	Battery Renewals	REPAIRS Total	REPAIRS Per Mile	Watt Hours per Car Mile	Lubricants per Mile	Garage Exps. p. Car p. Yr.	Sundries per Year	Depreciation Rate	INSURANCE Fire	INSURANCE Liability	INSURANCE Total
1,000	11	54	11,100	...	Retail Delivery	Excellent	Rolling	12	$147	$384	$404	$.0346	536	.....	....	...	25	$14	$235	$249
1,000	6	30	14,500	...	Retail Delivery	Excellent	Rolling	12	139	395	388	.0268	475	.....	$301	...	..	16	235	251
1,000	1	34	4,000	293	Retail Delivery	Excellent	Rolling	12	....	188	151	.0378	428	$.0010	....	...	12	...	.....	183
1,000	1	60	7,200	380	Maintenance	Good	Hilly	24	208	726	1014	.1410a	816a	.0036	....	$10	16	...	.....	....
1,000	1	32	16,200	694	Installation	Good	Hilly	32	334	675	810	.0500	404	.....	278	14	..	...	.....	....
1,000	1	25	11,700	560	Installation	Good	Hilly	25	34	433	406	.0347	417	.....	....	16	..	...	.....	....
1,000	1	19	10,200	446	Installation	Good	Hilly	19	38	301	417	.0409	459	.0026	....	15	..	...	.....	....
1,000	1	19	12,100	455	Installation	Good	Hilly	19	161	310	580	.0478	412	.....	....	12	..	...	.....	....
2,000	5	30	14,300	....	Retail Delivery	Excellent	Rolling	12	246	470	365	.0256	485	.....	....	...	..	20	235	255
2,000	1	15	4,000	390	Lamps	Excellent	Rolling	15	....	60	38	.0094b	949	.0010	307	...	..	...	.....	215
2,000	1	16	10,000	373	Lamps	Good	Flat	16	88	100	603	.0603	632	.....	....	76	10	13	....	13
2,000	1	78	4,600	...	Maintenance	Good	Hilly	16	176	530	709	.1540a	611	.....	....	8	..	...	.....	....
2,000	1	17	9,800	414	Maintenance	Good	Hilly	17	291	....	299	.0304	797	.0025	....	25	..	...	.....	....
2,000	4	24	12,400	574	Wholesale Delivery	Fair	Hilly	24	195	336	438	.0354	.....	.0006	13	...	20	35	40	75
3,000	1	26	21,700	610	Lamps	Good	Flat	26	300	120	651	.0308	.....	.....	112	48	..	15	....	15
4,000	1	12	11,100	273	Wholesale Delivery	Good	Flat	12	115	....	71	.0064b	1397	.0003	206	38	20	59	100	159
4,000	2	54	7,300	...	Retail Delivery	Excellent	Rolling	12	243	189	278	.0378	763	.....	....	...	25	20	235	255
5,000	1	16	9,300	380	Trucking	Good	Flat	16	276	....	321	.0344	3068	.0010	....	22	..	81	70	151
7,000	1	26	7,900	651	Trucking	Good	Hilly	26	470	274	471	.0596	1110	.0047	....	16	..	...	.....	....
10,000	1	15	2,800	366	Cable	Excellent	Rolling	15	316	43	58	.0205b	1480	.0013	....	...	..	...	.....	235

(a) Old style machine. (b) Not overhauled during period of report.

Condensed Table of Costs and Data—Using Electric Commercial Cars

To illustrate this point assume that each tire gives 8,000 miles, that all four tires are renewed at the same time, and that the life of the machine is 80,000 miles.

During the life of the machine 10 sets of tires are worn out, including those originally on the car when purchased. Hence, if the cost of a set of tires is $400, the total cost of the tires per mile is $400 x 10-80,000=5 cents. Only 9 sets of tires, however, are included in the tire renewal account, and consequently the cost of tire renewals is only $400 x 9-80,000=4.5 cents per mile. The quotient of the tire renewal account at any given period of the life of the car by the number of miles may be anywhere from 0 to 5 cents per mile; the greater the number of tires which have been charged to the tire renewal account, however, the more nearly will this quotient approximate the true tire expense.

By taking the average of a number of individual records extending over a period corresponding to the life of a single set of tires, including cases ranging from practically new tires at the time of the record to cases where the tires are practically worn out at the time of the record, the average figure will correspond to the case where the tires are half worn out. Consequently, by adding to this average figure half the cost of a new set of tires and dividing by the average number of miles run by each set, one can arrive at a closely approximate figure for the actual cost of the tires per mile.

In any actual case a number of other factors must be considered, as, for example, the improvement in the qualities of tires, the changes in prices from year to year, the fact that all four tires on a machine are not replaced at the same time, etc.

In addition, the tire cost per mile will depend upon the nature of the roads, overloading, speed, etc.

In the tables are given data on tire cost thus far collected, where the records cover a period of one year or more. The apparent cost of tire renewals per mile is obtained by dividing the total of the tire renewal account by the total number of miles.

Repairs

Under this heading we include the smaller repairs made from time to time and the general overhauling and painting of the truck, usually done once a year. Battery renewals are not included. To arrive at the average cost of repairs throughout the life of a truck is even more difficult than to obtain a true figure for tire cost. As already noted, records of cars which have been in service for a number of years should not be taken as representative of what may be expected of the modern cars. Again, records of cars which have been in service for only a year or two cannot be accepted as the probable average throughout the life of the car, since the repairs on a comparatively new car should be slight. Again, the amount of repairs will depend upon the character of the service to be performed, the nature of the roads and climate, and the system of operating.

The apparent cost of repairs per mile is obtained by dividing the total costs as given by the number of miles.

Battery Renewals

The average cost of battery renewals, throughout the life of a car, like the cost of repairs, can be arrived at from present operating records only by making due allowance for the time over which such records extend, and for a number of other items. As in the case of tires, a distinction should be made between battery renewals and the total cost of the battery elements over the life of the car. In other words, the relation between cost per mile for renewing the battery elements, the total annual expense of battery elements per mile (including the cost of these elements in the battery supplied with the car) and the quotient of the battery renewal account by the total mileage at any period in the life of the car, is similar to the relation between the three corresponding items in the case of tire renewals.

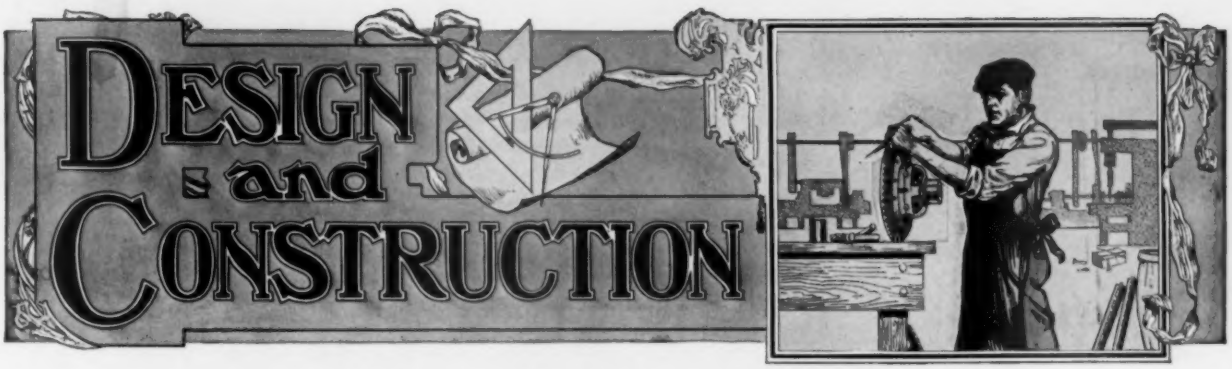
Battery renewals depend not only upon the mileage, but also upon the time in service, upon the number of cycles of charge and discharge, and upon a number of other items affecting the average energy consumption per mile, such as the number of stops, road surface, grades, loads, speeds, the care taken of the car, etc.

The apparent cost of battery renewals per mile is determined by dividing the total battery renewal account by the total number of miles.

Electricity

The rates for electric current in various cities differ considerably, and in many cases there is a sliding scale of

(*Continued on page 56*)



Motor Truck Frame Design

BY C. T. SCHAEFER
Member Society Automobile Engineers

THIS article on the subject of motor truck frames presents the various type of designs now in use at the present. In taking up the discussion of frame design it is necessary to refer to the general chassis construction in each case in order to clearly depict each type.

The most prominent types of truck frames may be divided into three classes.

First: the pressed steel frame.

Second: the structural channel frame.

Third: the structural I-beam frame.

These may again be divided into various classes, depending upon the general construction and material, as well as distribution of the main units.

Amongst the small cars under 1500-lbs. capacity, may be found a great variety of frames, ranging from the old wood frame to the pressed steel frame. There are still a number of makers who use the armored wood frame, also some using frames built up from structural angle. However, the pressed steel frame seems to be holding its own with the above-mentioned type in this class.

In the class ranging from 1500 to 3000-lbs. capacity, the pressed steel is very popular, also quite a few structural channels may be found in the above capacities.

Amongst the larger models the pressed steel frame seems to be gaining favor, being found on such well known trucks as the Smith-Milwaukee, Pierce 5-ton, Locomobile 5-ton, Hydraulic, Saurer and several others.

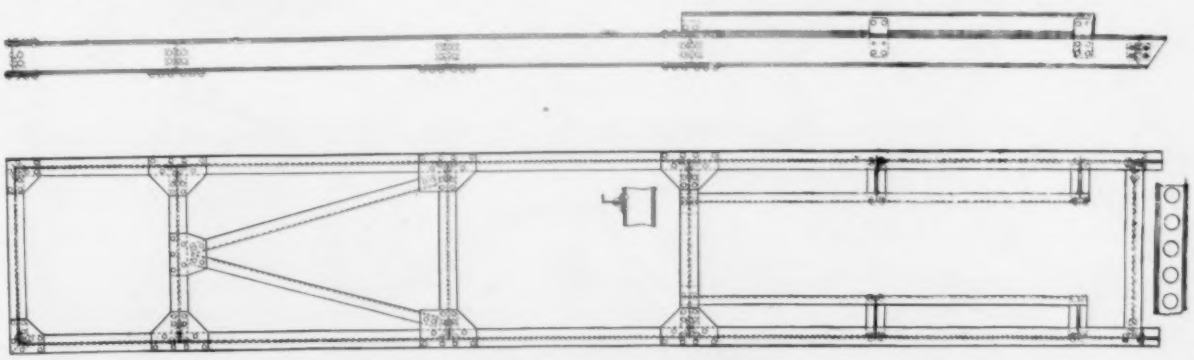
The structural or rolled channel is by far the most popular on trucks of 2-tons capacity and over, among which may be mentioned the United States, Mogul, Packard, Peerless, Knox, Gramm, Reliance and others.

On the Velie 3-ton truck a frame of I-beam section is used, while on the Avery tractor, the frame is built up from rectangular strip stock.

As these frames form the basis of chassis construction they are naturally subjected to very heavy stresses, particularly when the car is in motion on rough roads, when the side frame and cross members are twisted and strained in every direction.

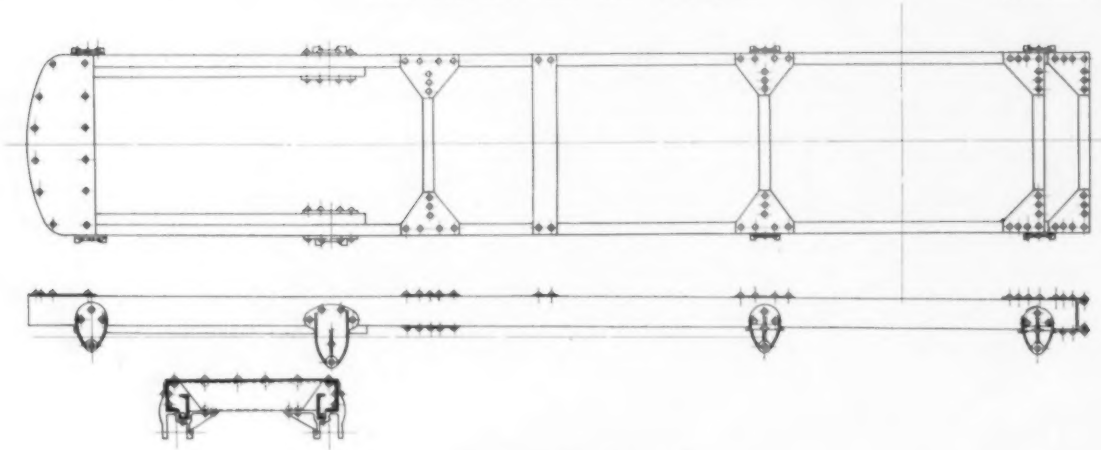
The frame is dependent to some extent upon the construction of the power-transmitting units and their mounting. The constant trend of obtaining perfect alignment for motor, clutch and transmission has resulted in the adoption of the unit power plant on some models, while in others, particularly the heavier type, flexible mounting of the units has been resorted to. In fact, regardless of unit construction, all individual units are generally flexibly mounted to some degree, in order to relieve them of the heavy stresses, caused by the frame weaving, when the road wheels mounted an obstacle on the road surface.

A feature worthy of mention in connection with the subject of frame construction is that it is almost universal practice to rivet all parts that may possibly be riveted. Even such



Velie Three-Ton Truck Frame

The frame members are I-beam construction, strengthened by cross members of the same design, also gusset plates. Diagonal pieces are used at the rear for stiffening the frame, these of channel stock, as is also the frame which supports the motor



Mogul Six-Ton Frame

The frame members are of channel section, as are also the cross members, and they are held together by the use of gusset plates. The subframe, for motor suspension, is of channel section

parts as may be subject to removal are riveted to the frame, but are provided with removable bronze bushings which may be removed when required. In some cases these parts are provided with caps to facilitate the removal of the bushings.

In discussing the advantages and disadvantages of the various types of frames, the pressed steel frame may be mentioned as being lighter in weight for equal strength of the structural or rolled channel and I-beam section, while its cost is considerably higher, due to the use of alloy steel in their construction in order to obtain strength. The cost of pressed steel frame may be stated as varying with the section, material and the nature and extent of bending. The section of the pressed steel frame is varied, being tapered to the front and formed to receive the spring hanger. This taper is usually kept very short, as considerable strength is required at this point, especially when the seat is placed above the motor, permitting the paying load to be carried well to the front.

Bumpers for this type of frame are usually attached by slot castings. These bumpers may be made from either heavy tubing, wrought iron pipe, or channel stock, and are usually riveted to the castings. They are generally placed at an angle to obtain as much protection as possible for the radiator.

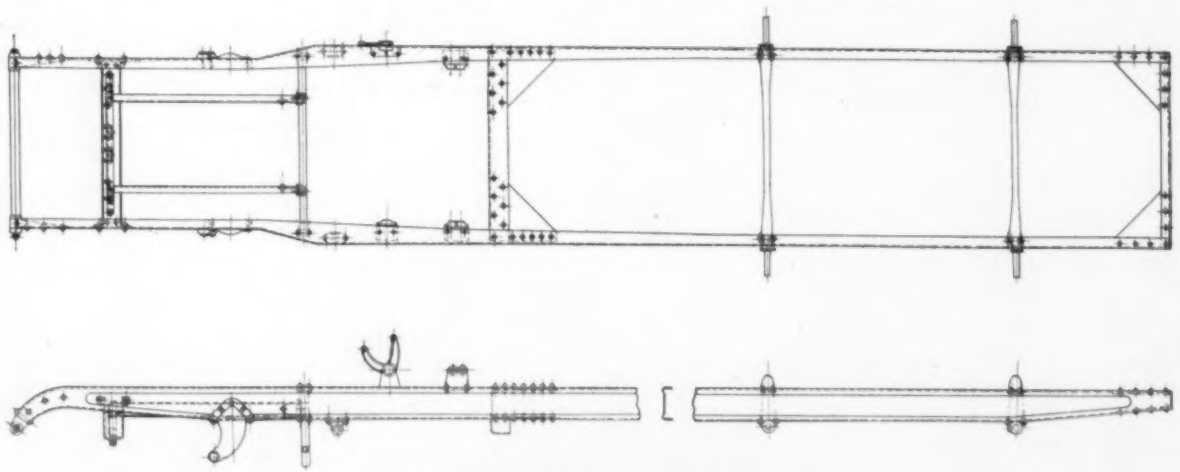
The flanges of the side members are usually made quite wide and when these members are inswept at the front end these flanges are given a gradual taper toward the rear end. This feature adds considerable strength to the member at the point of offset.

On the smaller trucks the cross members are formed with integral gusset plates, while on the larger models separate gusset plates of generous proportions are used.

When structural or rolled channel is used, the side members are invariably left straight and in some cases the bumpers are formed integral with the sides, while in other cases they are built up as mentioned above. There are also some designs in which wood beams are attached to the front cross member to form a bumper.

Cross members are usually made of the same material and proportions as the side members and in some cases steel castings are used as cross members, the latter being resorted to in cases where these are used to support the power transmitting units.

Spring hangers of various types may be found on either type of frame, some being steel castings riveted to the side members and acting as gusset plates for the cross members, while others are drop forgings.



Smith-Milwaukee Three-Ton Frame

The side members, of channel construction, have a bead rolled into them for stiffening same. The motor is mounted on a subframe and the whole frame is inswept in front to facilitate turning

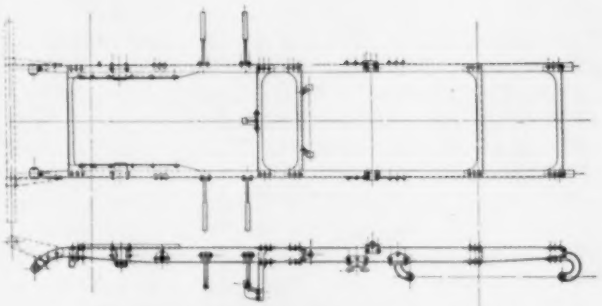
When structural steel of I-beam section is resorted to, the cross members are usually of the same section and material as the main side members. The flanges of the I-beam are wider and present a larger surface for riveting, as well as permitting the use of larger gusset plates. A claim for the latter construction as used on the Velie 3-ton truck is that this frame is 4 1-2 lbs. per foot heavier and 67 per cent. stronger than the channel or rolled section of equal proportions.

The I-beam section is heavier and stronger than the channel or rolled section, while its cost is not much more than the latter type. The structural frame of either side has the advantage of being lower in cost and heavier than the pressed steel frame. However, as the weight is not a serious factor in commercial car service, the latter can not be considered as a disadvantage to this type of frame.

The Palmer 1500-lb. frame is of the pressed steel type, wide straight side rails and integral gusset plates on the cross members. In this construction the chain drive and unit power plant is used, the latter being mounted on three points of support. This is accomplished by rigidly mounting the front motor arms on two brackets riveted to the side frame members, while the rear support is placed under the transmission, and pivotally mounted on a 1-in. bolt, passing through a bracket riveted to the large drop cross member. Another member is placed back of the latter to stiffen this point of the frame.

This construction permits locating the motor under the hood, and instead of using wood sills they are formed integral with the side rails. Angles laced with leather belt lacing are riveted to these sills to rigidly hold the hood and prevent it from rattling. A tubular bumper is located at the front and a cross member is used to carry the radiator.

A similar construction may be found on the following trucks; Joe Moon one and a half-ton, White shaft-driven models, Federal one-ton, Garford one and one-half ton, Adams one-ton, Lawton one-ton, Atlas 1500-lb., Natco one-ton, Jeffery

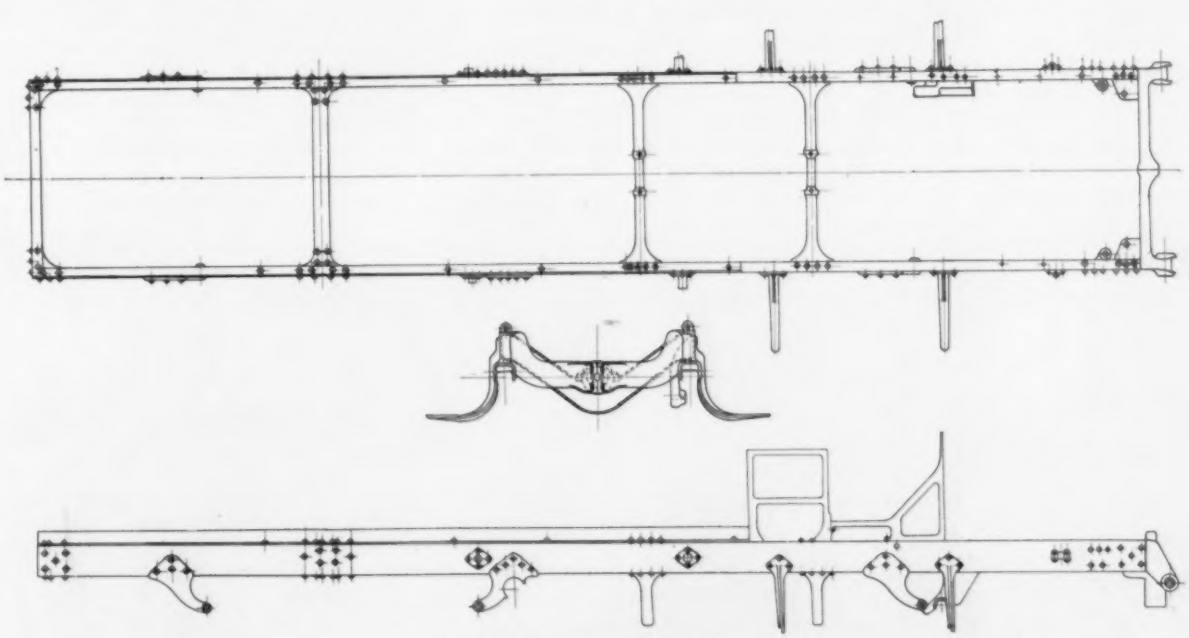


Palmer Fifteen Hundred Pound Frame

This frame is of the pressed-steel type, has wide, straight side rails and integral gusset plates on the cross members. The motor is suspended from side brackets in front and a cross member at the rear.

one and one half ton and quite a few others varying in capacity from three-quarter to one and a half tons.

The construction of the Smith-Milwaukee all steel, 3-ton truck differs from the above in that worm drive is used, having the transmission mounted on the torque tube of the axle, while the motor is a separate unit mounted on a sub-frame. In order to stiffen the side members, a bead is rolled into them, and then inswept at the front end to decrease the turning radius. The sub-frame is provided with a member for carrying the radiator combining the latter in a unit with the motor. This sub-frame is attached to a large member at the front end by two bolts, while the rear end of sub-frame members are bolted to heavy drop forged cross member. In this way the motor may be removed independent of the sub-frame, or the entire unit of sub-frame, motor, clutch and radiator may be removed. The third member is of heavy section and is utilized to carry the front end of the transmission. It is provided with heavy gusset plates. The rear spring hangers are heavy drop forgings and have integral studs for carrying the spring shackle links. These forgings extend the clear



United States Three-Ton Frame

Only three cross members are employed to give rigidity to the frame; however, the transmission supporting brackets are of solid construction and serve the two functions of supporting the transmission and strengthening the frame

width of the frame and act as frame cross members to stiffen the frame at this point. The rear member is pressed steel and provided with gusset plates of generous proportions.

The United States 3-ton frame is an illustration of the structural or rolled channel section frame, combined with steel castings and a construction in which each unit is mounted as flexibly as possible. The side members and rear cross members are 6 in. channels, while a 6 in. I-beam is placed over the rear axle to carry the auxiliary overload spring.

The units in this construction are the sub-frame carrying the motor, clutch, muffler, transmission and jack-shaft unit. The front member of the sub-frame is of I-beam section and similar to an I-beam front axle center. This member is flexibly mounted on springs, placed between the opening at each end. The sub-frame members are pressed steel channels, oak-filled, while the rear member is extended to carry a large space which forms the rear support. The muffler brackets are also attached to this sub-frame owing to the flexible mounting of the power plant.

A cast steel cross member of heavy section carries the rear support of the power plant, while the same type of member carries the front end of the transmission. This transmission is provided with a spherical support similar to the rear end of the sub-frame. The rear end of this unit is carried in spherical supports being formed integral with the spring hangers.

The front member is formed in two halves forming a bearing for the starting crank shaft, as well as the front spring hangers and the supports for the radiator.

Another type of structural or rolled channel frame is shown, which differs somewhat from the above, the principal features being the side members which are 7-in. channels. A huge bumper is formed integral with the side rails. This bumper has large gusset plates extending the width of the frame and a cross member to thoroughly support it.

A sub-frame is provided for carrying the motor, being mounted on the front spring brackets. All spring brackets have integral gusset plates, thus eliminating quite a few rivet holes in the lower flange of the channel, materially strengthening the whole structure. In this design the seat is placed above the motor and the chassis is an all-steel construction

A 3-ton frame built up from 6-in. structural I-beams is also shown. The feature claimed for this type of frame is a heavier and much stronger construction. This also depicts a construction in which individual units are featured with the motor located under a bonnet at the front end. The front cross member is bolted in position, so that it may readily be removed for removing the power plant. The front end of the sub-frame is open to permit removal of the units.

The structural or rolled channel and structural I-beam frames have the advantage of being lower in first cost over pressed steel frames of equal strength; however, they are much heavier and add considerable weight to the completed chassis. The pressed steel frame presents an advantage in assembling as the various parts are much easier attached to this frame owing to the flange being straight.

Demountable Body Increases Number of Deliveries Per Day

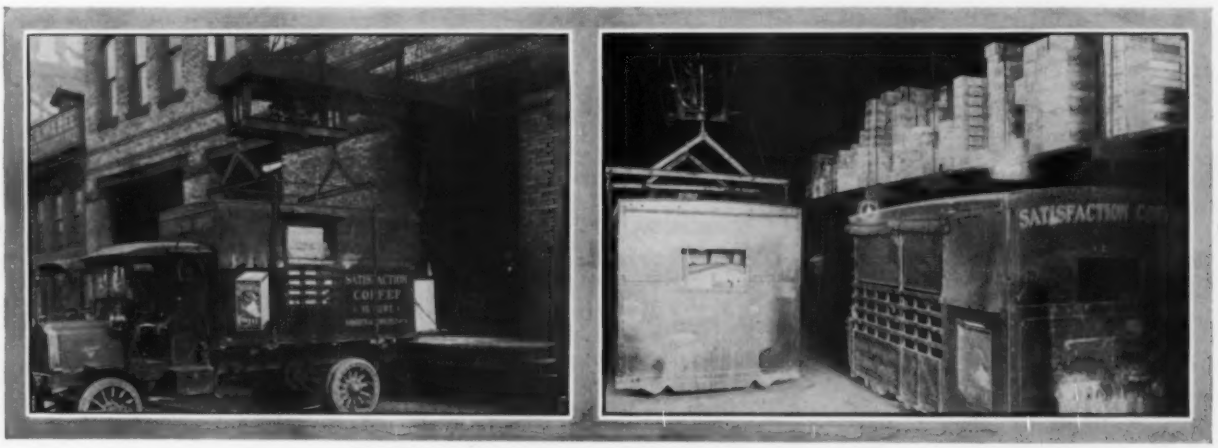
The illustrations show a demountable body used in the equipment of Haworth & Dewhurst, Ltd., of Pittsburg, Pa.

The distinctive feature in this mechanism is the elimination of rollers upon which the body rests while the truck is in transit. This has been attained by the use of angle irons laid on the chassis and on the bottom of the body so as to dovetail. A simple eccentric locking device clamps the body absolutely to the chassis. This wedge effect takes care of any variation in the placement of the truck backing under the electric crane and by which the bodies are moved in and out of the warehouse.

Haworth & Dewhurst's equipment consists now of three 3-ton Packard chasses and four demountable bodies, a driver for each truck and a helper for each body. By this system, the helper loads his own body while it is in the warehouse and no time is lost on the road looking for small packages.

The use of the body permits of an additional delivery per day for each chassis with a consequent reduction in operating costs figured on a tonnage basis of about 10 per cent.

The entire idea was designed and worked out to its smallest detail by Fred Haworth, after the various experts whom he had consulted had advised that his idea could not be carried out.



The Haworth & Dewhurst Method of Loading its Trucks

The Science of Delivering Goods

BY ALBERT M. PEARSON
Sales Manager, Philadelphia Truck Department, Locomobile Company of America

A DELIVERY department is the one place in a business enterprise where the condition of the whole organization is reflected. Here all the incompetence and unwillingness of the force is most strongly felt. This department is constantly harassed by the mistakes of the other component parts of the business; wrong directions; illegible handwriting; mixed orders *ad infinitum*. When, in addition, the blunders and indifference of the department itself are added, there is only one way to view the subject, and that is, that the management itself is fundamentally wrong, or such conditions could not exist.

For many reasons delivery systems have usually been the last feature in modern business methods to receive the attention of properly organized mechanical help. The counting room has adding machine, and loose leaf systems; the office has telephones and typewriters, but the transportation department, in most instances, sends out its goods in exactly the same manner that our progenitors distributed their products.

In the organization and installation of a scientific delivery service a paramount consideration is, or should be, the third party; the consumer, without whose existence neither the store nor the service can continue to live. Marshall Field has said, "The customer is always right," and knowing this, the public is now justly demanding the highest type of efficiency from all departments of business. It will no longer tolerate the firm which looks to profits alone. It resents methods which smack of dictation from the source of supplies, and governs with its patronage the demand for extra convenience in the delivery of its purchases.

Realizing the might as well as the right of the customer and the seriousness of his slightest displeasure, the primary principle to be worked out in the system is how to place goods in the hands of purchasers in the least possible time. Tuesdays, Thursdays and Saturdays won't do, because someone else is delivering on Monday, Wednesday and Friday. Therefore the advisable delivery is the one which occurs within the shortest time possible after the purchase takes place. The sooner, the better, for two reasons: First, it means the satisfied customer; and second, the advertisement distribution of the goods by which room is made for subsequent deliveries.

The principal handicap under which most of the present delivery departments are operated is the almost universal and unscientific practice of depending on the personal skill of the man at the head of the department, rather than on some system properly worked out by the management itself, or other responsible direction.

Most heads of business enterprises realizing their lack of knowledge of the details of delivery goods, employ the best man within reach, and frankly place before him the problem of doing the work in the most economical way. The weakness in this plan of depending on one man's past experience lies in the fact that most of the work is done by "guessing." He guesses that horses cost so much, and so much will be the expense of packing parcels, etc. In fact, almost everything connected with the department is a guess, and while he is approximately correct, it is just that small difference between the guess and the fact in which the loss or profit lies. Whereas the proper method would be to work out a system on scientific principles, and depend on this superintendent of delivery to carry out the system to its greatest efficiency. In other words, to manage the distribution of goods from the office instead of the packing room.

The solution lies in the institution of a systematic management of the transportation from the office proper; the development by the management, not by the worker, of scientific delivery, with rigid rules for each movement, and the perfection and standardization of all appliances and working conditions, rather than the search for a remarkable or unusual man.

A transportation system scientifically established and scientifically carried out is not an expense; it is an asset of incalculable value, drawing the most extraordinary dividends. Nothing pays like an absolutely contented patron, and nothing gratifies the man who pays out his money like having purchases waiting for him when he gets home.

The greatest source of loss in a delivery service is the intangible waste from the ill-directed efforts of man and animals. We can see and feel material loss like too much paper or too much twine, but the remedy for the use of two movements when one would suffice calls for a strong effort of the imagination. For this reason, though this is greater than the material waste, it does not appeal to us so strongly. Consequently the solution lies in the institution of a systematic management of the transportation from the office proper; the development by the management, not by the worker, of scientific delivery, with rigid rules for each movement, and the perfection and standardization of all appliances and working conditions, rather than the search for a remarkable or unusual man. Once this supreme principle is realized and carried out, the results will be far beyond the fondest hopes.

There is no question but that the delivery system of an establishment can be made a science, and operated with a profit, rather than useless expense; therefore, the first question which naturally arises in the mind of the management is: How shall the introduction of a scientific delivery service be started?

The scientific distribution of wares is fraught with many rules and laws which govern the different features of different services. To attempt to lay these down would, of course, be almost impossible, besides covering so many sheets with data that no one would undertake its perusal. There are, however,

three basic principles, as follows, upon which the whole structure of scientific delivery is built:

Basic Principles

I. A straight line is the shortest distance between two given points.

II. Study of "time" so that each movement of the worker will accomplish the greatest results.

III. Almost equal distribution of responsibility between the management and the delivery department.

Perhaps at this time, it is well to make some slight comment on these three fundamental laws, and why they govern delivery so completely.

Number one is as old as the hills. Every school boy knows it; yet few men apply it. If "A" has a package to deliver to "B" the easiest and quickest way is for "A" to take that parcel straight to "B" by hand or wagon, or whatever method is necessary. Now a delivery system is simply that one package multiplied by two, or two hundred, or whatever number there may be. The thing which makes the trouble is the number of parcels. They dazzle and confuse; they take you off your feet. The size worries, and man begins to invent a complicated process to take care of a simple problem, the consequence of which is, big expense and poor results. Always bear in mind that a three-ring circus is only a one-ring circus multiplied by three, and the solution will be greatly facilitated.

Eliminate Lost Motions

Number two is tritely stated in the old axiom—"Time is money." Not an hour of the day, not a minute of the hour, not an atom of energy may be squandered by so much as an extra motion, if the highest efficiency is to be attained in this delivery department. Even wrapping twine should be so placed that one movement makes it accessible for use. Tables should be of exactly the right height to preserve the energy of the workman for the greatest task. The fewest possible steps to the wagon figured out. Every motion made to count the most, and thereby save the time, which means the profits.

Number three relates to laws of specialization. This is the day of the specialist, where each man, like the surgeon, or the oculist takes up some special task, and devotes his time to the development of efficiency in it, so the work of the specialist in business management is to develop the individual efficiency of each worker, and be responsible therefor. The worker likewise must perform the task laid out for him in the best possible manner. In this way, the responsibility between the management and worker is almost equally divided. By this plan, the management assumes the work best suited to them, whereas without this arrangement, the worker does almost all the work, and also takes the greater part of the responsibility.

Planner and Worker

In a properly organized delivery system two units are essential, which for convenience we are designating the Planner and the Worker. After reaching a decision to operate such a system upon the scientific principles indicated, the first requisite is a transportation or planning office. The practical use of scientific data calls for a room in which to keep the books, records, etc., and a desk for the planner. Because the installation of a scientific delivery means much preliminary work, the gathering together of hundreds of pages of records on the system as formerly used, such as costs, distances, time, errors, etc., in order that the planner may be able to correctly lay out and bring into execution the new order and arrangement. Thus all the planning which was done by the workman, as a result of his personal knowledge, under the old methods, under the new system, must be done by the management in accordance with the three laws of delivery science and their many ramifications, because it is clear that even were a workman mentally suited for the development of transportation science, it would be a physical impossibility for him to be at the task and at the desk at the same time; and it is also clear that the man to plan, and direct, and the one to execute must be of radically different types.

Right here let us warn this planner's office against an effort to establish a delivery service in its entirety, or even a very large portion of the system at one time, because to do so means a misapplication of energy, and, therefore, undesired results. To successfully install a scientific delivery, one must work slowly from one end through to the other. One must pull it, beginning slowly at first, but pull steadily. Then, gathering force day by day, it will stand out ultimately as an irresistible power in the business organization.

The work of the planner's office, like the fundamental laws of delivery, is divided into three parts,—viz.:

I. The organization of the salesroom with proper delivery to the packing room.

II. The arrangement of the packing room for efficient loading and unloading of the vehicles.

III. The routing of the outside territory for the prompt possible delivery to the customer.

Naturally the application of these rules must vary to suit the particular character of the business and the conditions surrounding it. As an illustration of how this work should be carried through, we use a department store as typical of a varied and difficult delivery system to establish and administer.

How to Recognize the Delivery

By rule number one, the planner should start in the salesroom of the store. There he should study and familiarize himself department by department. He should watch and note the number of movements the clerks made in handling the merchandise, particularly after the purchase; the time consumed between sales counter and the latter; also the facility exercised at the wrapping desk, before the parcel is ready for delivery. He should measure the heights of the counters, and the positions of the necessary adjuncts for the wrapping, etc., of parcels. He should study the time necessary to perform these different duties. He should study the methods and time employed in getting the merchandise from the sales counter to the packing room. In fact, from every possible angle, he should study, and make definite data of the exact location and circumstances covering the relation of a department to the common packing room. This data comparatively secured, the next step is to put it on a scientific basis by eliminating unnecessary movements, and changing undesirable conditions to meet the exigencies of the occasion.

By rule number two, the planner should study the position of the packing room in relation to the rest of the store, and the outside territory. If the room is in the basement, is that the correct place, for the greatest efficiency? Are the dummies and elevators leading to this room, also the packing counters, paper and twine, in the most available locations for prompt and accurate disposal to the carrier? Careful attention should be given to the size, shape and adaptability of labels as well as the way in which addresses and entries in books which may be used in the work are made. Bad writing costs

many a dollar in delivery. The data thus necessary is considerable, but once gathered, the solution is comparatively easy, for by applying the three fundamental laws, the system will work itself out automatically.

In the application of rule number three lies probably the greatest saving in modern and scientific delivery. The reason for this exists in the fact that motor-driven trucks having come into existence and common use substitute an exact mechanical device for the uncertain physical power of animal drawn vehicles. In addition to the advantages thus gained, there are also the many special types of bodies, and devices for expediting, loading and unloading. A truck has not only given speed, and carrying capacity, but is unaffected by weather conditions. With these positive factors, the planner is at once in possession of the means by which, barring accident, he can definitely lay out routes with a certainty of the deliveries being made in accordance in a minimum time.

To accomplish this work scientifically, he should procure maps of his districts, and lay out his routes. Then he should go over these routes and measure up his distances. Some blocks are shorter than others; a few feet saved each day means miles at the end of the year. It is also best to carefully study the condition of the different streets. Good paving means extra speed, and a very great saving on the machinery itself, as well as the fuel consumption. A railroad spends millions to straighten a few miles of track because of the great saving of fuel and rolling stock.

He should study the situation as to whether he wants to employ relay stations, or deliver directly from the store. He should study the drivers of his trucks, and the motions they make in executing their work. He should study the problem of the helper—how many, and what their duties are to be, and all of this study must be carefully tabulated; because, the data, like the maps of his districts, contain the conditions which lay plainly before him the proper application of the three fundamental laws of the Science of Delivery.

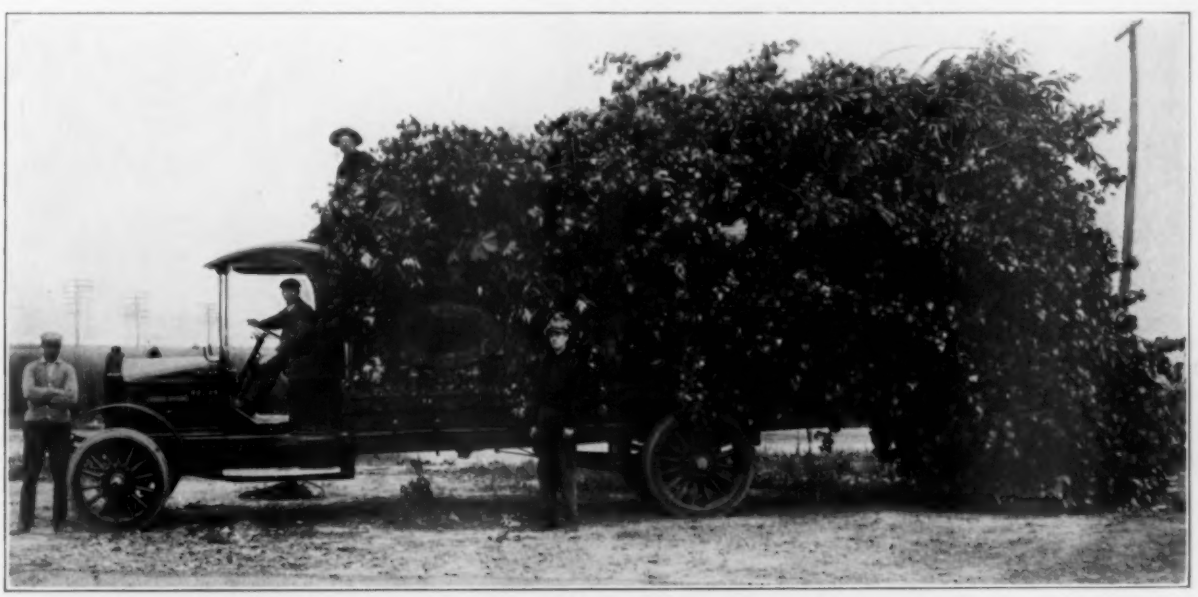
CONSIDERS TRUCKS A GREAT ADVANTAGE

In speaking of his experience with motor trucks, George H. Barbour, vice-president and general manager of the Michigan Stove Company, Detroit, Mich., says that while horses are good for short hauls, it is the motor truck that shows to greater advantage on hauls of five miles and over. This company uses a Packard and a Federal truck, which have greatly reduced the number of horses used. In keeping a cost record, this concern does not figure the cost on a tonnage basis, but on the number of miles and the cost per mile.

THE PALMER-BEE COMPANY, of Detroit, Mich., manufacturing engineers and millwrights, recently put into service a motor truck which is doing more work than one double team and one single horse truck. The company figures that the truck is saving it from $800 to $1000 per year, in addition to giving service, which could not possibly be obtained with horses.

A Practical Piggins Truck

This truck has been in the service of Asdahl and Nelson, Racine, Wis., for two years, hauling flour, feed and building material. The illustration shows the truck loaded with eighty sacks of flour, each sack weighing one hundred pounds. This is a two-ton truck and is carrying four tons. It is built by the Piggins Motor Truck Company, Racine, Wis.



Pierce-Arrow Used by Buffalo Park Department

The five-ton worm drive Pierce-Arrow truck used by the Park Department of the city of Buffalo, in transporting trees and supplies. Most of the loads carried on this truck are bulky, and for that reason the long wheel base—seventeen feet—was purchased. The body is of the platform and stake type, sixteen feet long and six feet six inches wide.

The Universal One-Ton, Worm-Driven Commercial Car

ONE OF the latest additions to the worm drive fold is the Universal one-ton car manufactured by the Universal Motor Truck Company, of Detroit, Mich. This concern previously built a three-ton car with double side chain drive. The new worm-driven truck is built in one size only—that being one ton. Besides the worm-drive feature may also be mentioned, center control and left side steering.

Worm Drive

The worm is made of hardened and ground steel. It is 6 in. long and 2½ in. in diameter, carried in the top section of the rear axle housing, in addition to the differential. The worm shaft is supported at each end on annular ball bearings, while at the rear of the casing there are two ball thrust bearings with ½ in. steel balls. Thus ample care is taken for the thrust in either direction. The worm wheel is bronze 12 in. in diameter. The differential is of the spur gear type, with ⅞ in. spurs.

Central Control

The shift lever is straight with a ball at the top end and is supported in the cover of the gear box, at this point being rounded and seating in two bronze collars which may be adjusted. The bottom of the shifter is rounded and in neutral lies between the two gear shifters. Gear box cover also supports the clutch pedal and emergency brake lever.

A single pedal operates the clutch and the service brake, the hand lever the emergency. The carburetor is 1¼ in., single jet, automatic. Spark and throttle levers are under the steering wheel. There is also foot control of carburetor.

Steering is from the left through a worm and double split nut system, post 1¾ in., wheel 18 in. Cross connection is back of the axle and is 1⅛ in. in diameter, drag link having ball and socket joints.

The Power Plant

This is a four-cylinder L-head en bloc motor, rated at 30 h. p. and having cylinder dimensions of 3¾ in. bore and 5¼ in. stroke. The valves are nickel steel, 1¾ in. in the clear, enclosed by cover plates. The lifters are of the mushroom type, working in cast iron guides, clamped to the crank case. The solid cam shaft is 15-16 in. in diameter, face of the cams being ½ in. The timing gear flange is formed with the shaft. Owing to the compact design of the cylinder casting only two main bearings are necessary. The crank shaft has an integral web for detaching the 15½ in. fly wheel. The connecting rods are H-section forgings, bushed at the top with bronze, while the crank pin bearings are split, and are held together with two ½ in. bolts, lock nuts and cotters. The pistons are fitted with four ¼ in. rings, disposed above the 1¼ in. piston pin, which is secured to the piston.

Cooling, Lubrication and Ignition

Cooling is by thermo syphon system. The radiator is mounted on springs in brackets on the frame rails. A feature of this radiator is that it is made up of vertical spiral tubes soldered into heavy brass headers, top and bottom. The top tank is an aluminum casting, formed with the water intake pipe, overflow boss, dash and tie rod support, bonnet, hinge ledge and filler pipe. The top tank is formed with vertical radiator fins, same construction at the sides. The bottom tank is bronze. A six bladed rim-bound fan is used, this being driven from a leather belt and idler.

Chassis of the Universal One-Ton, Worm-Driven Truck

Side elevation of the chassis, showing the tapering torque arms, also the tapering frame, the side rails of which taper from 6 in. in front to 4 in. at the rear. Note the absence of rivets in the frame rails, also the method of suspending the frame

Lubrication is by force feed and constant level splash. The crank case, of barrel type, and made of cast iron, elements introduced from the rear has formed with it an oil pump housing or tank. The bottom of the case proper has a false bottom or splash basin with individual troughs for the rods. The oil is circulated by the gear pump to a main lead, and thence direct to each trough, the overflow passing back to the base.

Ignition is by Eisemann Dual System, magneto and battery. It is located at the right side, rear, driven from the oil pump shaft. Plugs are located over the intake valves. Switch is on the dash, and spark lever is under the steering wheel.

Clutch and Transmission

The clutch is a single 14 in. steel disc, clamped between two Raybestos faced plates. The bearing is plain, and operated through pedal.

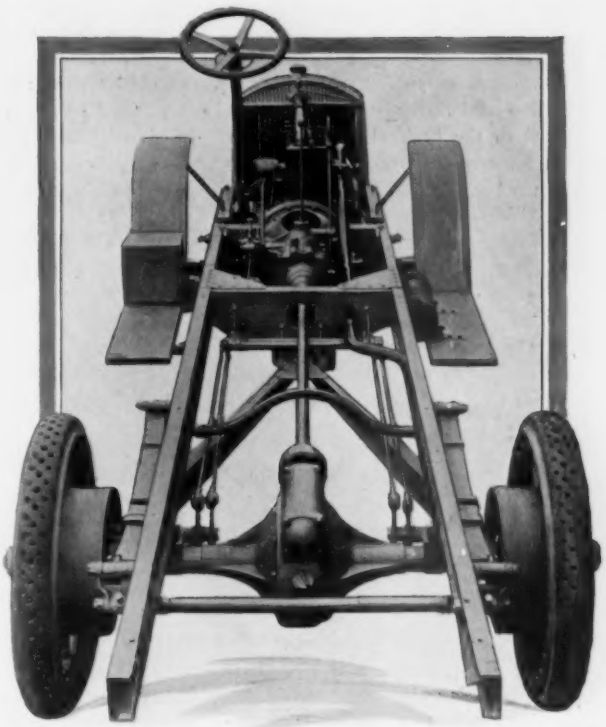
The transmission is three speed selective sliding gear type, and forms a unit with the motor, the gear casing being bolted to the fly-wheel housing. The unit is supported at three points, two at the rear of the crank case, through integral webbed arms, while the forward end is supported on a dropped forged, arched hanger.

Pressed-Steel Frame

The frame is pressed steel, rails straight throughout. The side rails taper from 6 to 4 in. at the rear. Stock is 3-16 in. and web 2 in. wide. Both rear spring hangers are 1¼ in. steel bars, the forward being arched over the propeller shaft. These two bars serve as reinforcements of the frame.

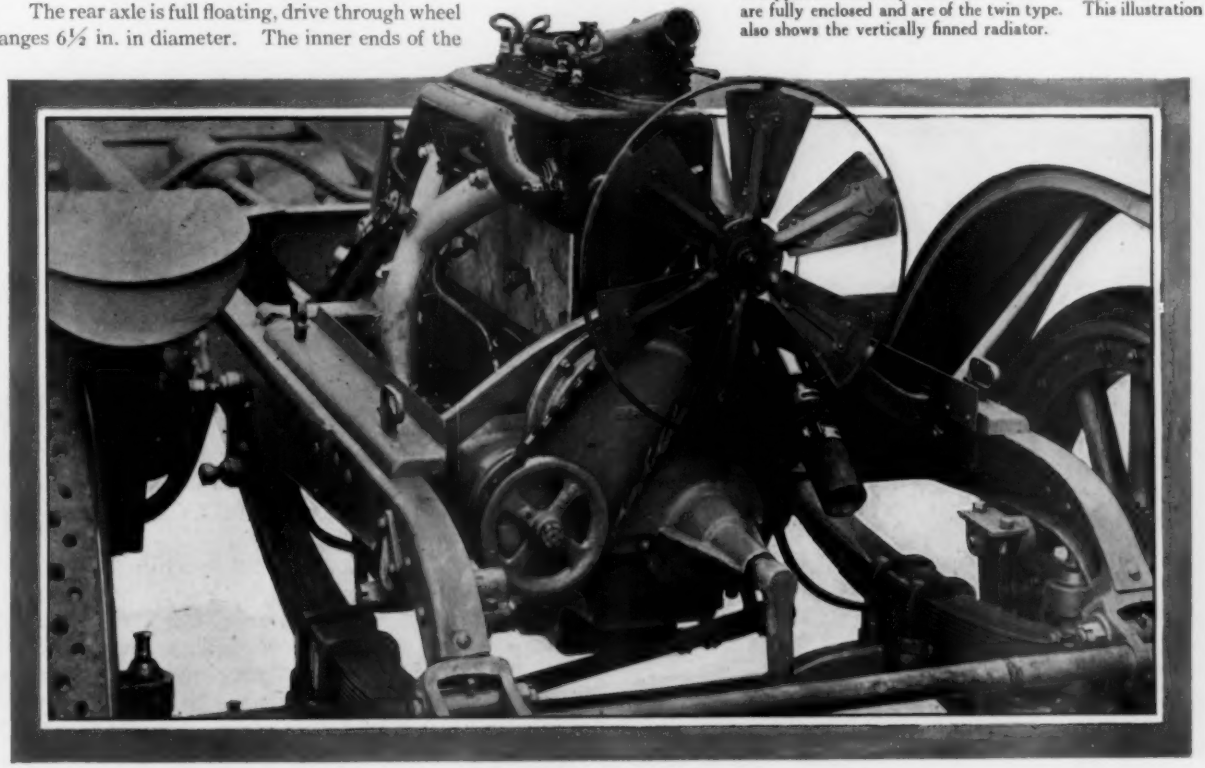
Axles

The rear axle is full floating, drive through wheel flanges 6½ in. in diameter. The inner ends of the



Bird's-eye View of the Universal Chassis

Attention is called to the absence of the usual cross braces in the design of the frame. The rear spring hangers are used to stiffen the frame. Note the tube from the muffler, carried in the right frame rail. The worm is supported in the top of the differential housing. The brakes are fully enclosed and are of the twin type. This illustration also shows the vertically finned radiator.



The Universal Power Plant

Forward end of the motor, with fan and belt, is here shown. The valve stems are enclosed, access being through cover plates, held in place by wing nuts. Attention is called to the forward motor support frame reinforcement, passing between the first cylinder and the fan. The governor regulator shutter can be seen located in the crotch of the intake manifold.

1¾ in. drivers are fitted with four splines, ⅜ in. wide. The rear axle housing is cast steel, split horizontally. Rear axle bearings are annular ball.

Drive is through a triangular, pressed steel torque arm. The diagonal rails are 5 in. deep at the rear, where they are riveted to the brake brackets, and 1¾ in. deep, where they meet forward in a triangular gusset. A heavy, steel casting is secured at the forward end and this receives a plain, square, steel block through which a steel pin passes. Anchorage is to a heavy steel bracket on a pressed steel cross member of the frame. The arm is universal in action, since it permits motion up and down and sidewise.

The front axle is I-beam, of the reversed Elliott type. The wheel bearings are Timken roller. The steering pivot arm is made in the form of a yoke with two parallel, planed surfaces which seat on the pivot. This arm is secured through two long steel bolts, lock nuts and cotters.

Springs, Wheels and Tires

The springs are semi-elliptic front and rear. Front ends of forward sets are secured to the frame ends, shackled at the rear. These are 38 x 2½ in. The rear springs, anchored to the axle tubes, both ends being shackled, are 48 x 2½ in.

Artillery type wood wheels are used, 34 in. in diameter, twelve spokes, 2 x 1¾ in. front and rear. Tires, solid rubber, are 34 x 3½ in. front, 34 x 5 in. rear.

Governor and Brakes

The speed of the car is 15 m. p. h., and is controlled by an automatic, fly-ball governor carried at the end of the oil pump housing and fully enclosed. The governor operates a butterfly valve which chokes the mixture immediately the car reaches the limit.

Twin, internal expanding brakes are fitted, 16 x 2 in., shoes steel, faced with Raybestos. Pull rods are steel and the shoes are fully enclosed.

Drive to the rear axle is through a 1⅝ in. propeller shaft, fitted with double universal joints back of the transmission.

The wheel base is 124 in., tread 56 in., loading space in standard car 9 x 5 ft., in the special 12 x 5 ft. Equipment includes three oil lamps, horn, jack and complete set of tools. Price of chassis only is $2000.

KEARNS DELIVERY WAGON

The Kearns Motor Car Company, Beavertown, Pa., is placing on the market a commercial car of the 1500 lb. carrying capacity type. This car is gearless, clutchless and valveless. The 1913 line of power wagons consists of but one chassis, which can be fitted with any kind of body, to fill the requirements of the particular kind of work it is intended for.

The two-cycle, air-cooled motor, developing 20 h. p., is located forward under a hood, easily removable for the inspection of the motor. This hood has a large brass radiator in front, which has no connection whatever with the motor, but only affects the appearance of the car. The fins on the cylinder are of copper, to facilitate radiation. Both intake and exhaust manifolds are located on the left side. There are hand holes at the side of the crank case to give access to the connecting rod bearings for adjustment. The rim bound fan is supported by an adjustable bracket and is driven from a pulley, mounted on the crank shaft.

The Kearns 1500 lb. Car
This car is powered by a 20 h.p., two-cycle, air-cooled motor. The drive is by friction transmission

The carburetor is of Schebler make and is connected to the intake pipe, below the crank case. The Atwater-Kent ignition system is employed, or the Eisemann high tension self-contained magneto with fixed spark can be installed.

The crank shaft is supported in an aluminum crank case. The friction drive transmission is equipped with large roller bearings. The driving chains are ⅝ in. roller. The full elliptic springs are of 2 in. dragon grade steel. Wheels are of wood, equipped with Swinehart solid tires.

The weight complete without load, of the covered delivery wagon, is 2150 lbs. Speed is controlled entirely by throttle on the steering gear, spark being set. The Kearns truck comes equipped with the Shur-Go engine starter.

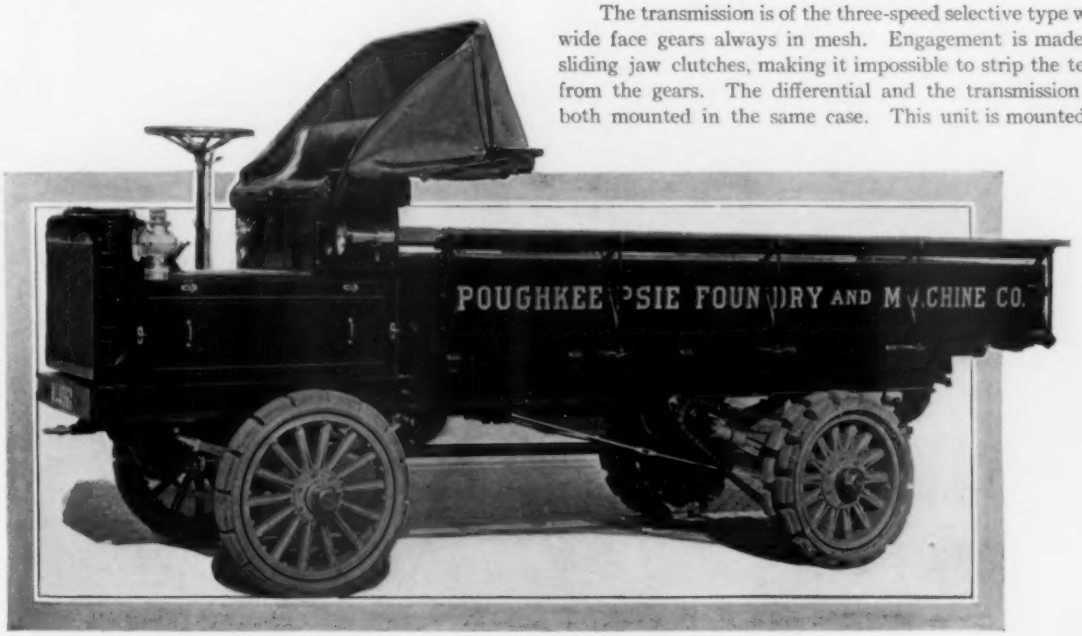
LA FRANCE GASOLINE-HYDRAULIC TRUCK IMPROVEMENTS

The La France Gasoline-Hydraulic Truck, distributed by the Hydraulic Truck Sales Company, of 1777 Broadway, New York City, and manufactured by the American La-France Fire Engine Company, of Elmira, N. Y., has recently been improved and several new features have been added. The new differential lock consists of a little valve controlled by a lever. This valve can be turned so that all of the oil from the pump goes to either one or the other motor, or both. Normally the truck runs with the oil going to both motors. The mechanism permits each driving wheel to be driven independently of the other.

A governor is also being placed on all trucks, this of the ball type similar in construction to the governor on a Corliss engine. The governor is so arranged that it cannot be tampered with, and to disconnect the governor would make it impossible to start the motor. The governor is said to be positive and does not move until the engine is running at 1200 r. p. m., at which point it starts to cut off the gasoline supply. If the truck is running light and the throttle is wide open, the governor automatically shuts down the gasoline supply, until the motor gets just enough gas to keep it running at 1200 r. p. m.

The King Three and a Half Ton Truck

THE particular features noted in the design of the King 3½ ton truck manufactured by the A. R. King Manufacturing Company, Kingston, N. Y., lie in the location of the motor and the short wheel base. One of the reasons for the short wheel base is that the truck can be turned in a small radius and a more uniform distribution of weight on the front and rear wheels is allowed, which is a great factor in prolonging the life of the tires. Special attention is given to the sturdy construction of the truck, especially the frame, which is made of cold rolled channel steel with the necessary cross members and braces riveted together with large size steel rivets. Nickel steel is used in the construction of the spring bolts, driving and jack shafts, while the spring hangers and jack shaft bearing housings are made of steel castings. Steel keys are used wherever keying is necessary and every part requiring to be lubricated is provided with oil or grease cups. All drilling and boring is done according to carefully machined jigs so that replacement of parts becomes a simple matter.



The King Three and a Half Ton Truck, Fitted With Open, Flare Body

This illustration shows the three and a half ton King Truck fitted with an open, flare-board body, the feature of which is that the body is entirely separate from the driver's seat. Attention is also called to the location of the motor, which is directy under the floorboard, and is accessible by large panels located on both sides, easily removable. The transmission is of the three-speed selective type, mounted on three-point suspension. The differential and transmission are mounted in the same case.

The Motor and Clutch

The motor is of the four cylinder, four cycle type, cylinders cast in pairs, with enclosed valves all on one side. The motor is rated at 34.4 h. p. and has a bore of 4½ in. and a stroke of 5½ in. The clutch is of multiple disc type with 21 plates, steel and Raybestos faced. The end of the clutch shaft is supported by roller bearings in the sub-frame, which relieves the rear bearing of end thrust. Both the motor and the clutch form a unit which is mounted on an independent sub-frame with three point suspension, and can be removed from the front without disturbing the foot boards or the seat. The motor is cooled by water circulating from the centrifugal pump, assisted by an 18 in. belt driven fan. The radiator is of the vertical tube type, suspended on springs.

Lubrication is of the self-contained force feed type. The oil circulates from the reservoir through a sight feed to the crank case, where lubrication is by splash, from whence the overflow runs through a reservoir and is filtered before being used again.

Ignition is by Bosch dual system, with set spark.

Transmission and Differential

The transmission is of the three-speed selective type with wide face gears always in mesh. Engagement is made by sliding jaw clutches, making it impossible to strip the teeth from the gears. The differential and the transmission are both mounted in the same case. This unit is mounted on an independent sub-frame on three-point suspension. The drive is by double chain from jack shafts to rear wheels. The front sprocket has 14 teeth, rear sprocket has 48 teeth. The chains are 1½ in. pitch, ⅞ in. rollers, 1 in. wide.

The Brakes

The external contracting brakes are fitted on the jack shaft, operated by a foot pedal. These are 10 in. in diameter. The internal expanding brakes are located in the rear wheel drums and are 18 in. in diameter. These are operated by a hand lever. Both sets of brakes are equalized.

Springs and Axles

The springs are semi-elliptic, 44 in. long in front and 54 in. long in the rear, made from Krupp steel. Spring bolts are of nickel steel, 1 in. in diameter, heat treated and ground to exact size.

The front axles are of drop-forged I-beam section. The rear is a rectangular section 2¼ x 3 in. The speed of the King truck is 12 m. p. h. on high gear; 7.3 m. p. h. on intermediate; 2.4 m. p. h. on low, and 2.5 m. p. h. on reverse. Speed is controlled by a sealed governor. The capacity of the truck is approximately 7000 lbs. Body platform is 13 ft. long by any width up to 72 in. The wheelbase is 120 in., the front tread 62 in., the rear tread is 64½ in. The frame is of rolled channel steel, 6 in. deep, 38 in. wide over all. The total length of frame is 198 in. and the height of the frame when loaded is 37 in. from the ground.

The tires are 36 x 6 in. single in front and 36 x 4 in. dual in the rear, mounted on S. A. E. Standard demountable rims. The steering gear is of the irreversible heavy truck type, with 22 in. wheel. The strut rods are of cast steel, mounted concentric with the sprockets, giving constant chain tension under varying loads. Adjustable head in strut rod gives easy and quick chain adjustment. The bearings are of Timken roller type, with steering knuckles, hubs and jack shaft hangers. Hess-Bright ball bearings are used in the transmission.

The equipment consists of an upholstered seat, two side oil lamps, oil tail lamp, full set of tools, jack, Klaxon and Warner speedometer. The gasoline tank is made of pressed steel, with the capacity of 20 gals. The price of the chassis with priming coat of paint is $3350, f. o. b. factory.

The Chase Model M, Five Hundred Pound Delivery Car

IN PLACING its new model M, 500 lb. delivery car upon the market, the Chase Motor Truck Company, of Syracuse, N. Y., fills the gap in its line for a low priced and small capacity commercial car. Thus the Chase line is now made up of six models, from 500 to 4000 lbs. capacity.

Motor, Lubrication and Ignition

In this new model there is used a 12 h. p., two cylinder, air-cooled Chase motor, of two-cycle type. The motor is located vertically under the hood. The cylinder dimensions are 4⅛ in. bore and 4 in. stroke. The oil for lubrication is placed in the gasoline tank and thus fed to the motor, thereby eliminating the use of a special oiler. A high tension magneto is used for ignition purposes, having a fixed spark.

Transmission and Control

The transmission is of the planetary type, having two speeds forward and a reverse, inclosed in an oil-tight case. The throttle lever is located on the steering column below the steering wheel. The right pedal applies the service brake, the left pedal operates low speed, while reverse is operated by the center pedal. A hand lever operates the high speed.

Drive, Axles and Tires

From the motor, power is transmitted through the planetary transmission to a jack shaft, there to side chains to the rear wheel. The brakes are of the duplex type, direct on rear wheels. The rear axle is of square section, 1⅜ in., the front also square, 1¼ in. Solid tires are employed throughout, front 2 in., rear also 2 in.

Wheels and Springs

Wood wheels are employed, front 34 in., rear 36 in., having a tread of 58 in., wheel-base being 84 in. There is a cross spring in the rear 1¾ in., while in front full elliptic springs are used, 1½ in.

The Chase $500 Five Hundred Pound Model M Delivery Car

The above illustration shows the latest product of the Chase Motor Truck Company, of Syracuse, N. Y. This machine is powered with a 12 h.p., two-cylinder, air-cooled, two-cycle Chase motor

Dimensions of Body

The body has an outside dimension of 96 x 42 in., inside dimensions; 58 x 40 x 9 in. under seat. The truck weighs 1500 lbs., and has a load capacity of 500 lbs. The engine has a gasoline consumption of 15 miles per gallon. The equipment consists of three oil lamps and horn.

This model of Chase truck, illustrated, sells for $500; with panel top $100 extra.

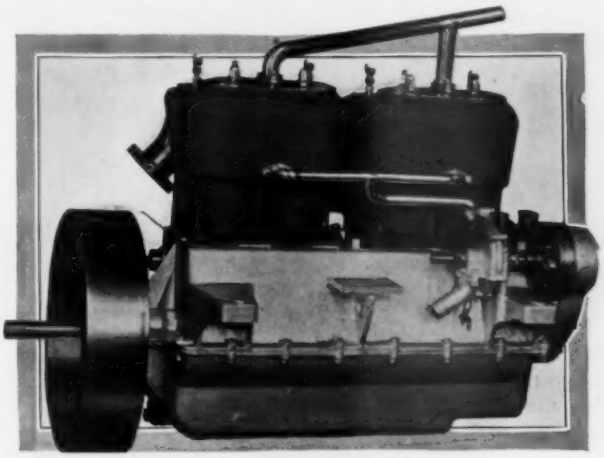
Lambert 1913 Commercial Cars

IN DESIGNING its 1913 models, the Buckeye Manufacturing Company, of Anderson, Ind., has made a few changes, especially on its two-ton model. The changes consist of a heavier motor designed to run at slower speed than the one used in last year's model. A heavier axle is also used. The jack shaft has been changed, it being constructed the same as a regular rear axle. The rear tires have been increased in size from 4 to 5 in.

The one-ton truck remains the same as in the past. The Lambert patented friction transmission is continued without any change whatever, and as the construction of this is well known, no detailed description is here necessary.

The New Motor

The motor used in the two-ton model is rated at 35 h. p. The cylinders are cast en bloc, and have a bore of 4⅛ in. and a stroke of 4½ in. The crank shaft is of drop forged steel type mounted on two bearings of the annular ball type. These bearings are 5 in. outside diameter. The diameter of the crank shaft is 2¼ in. The connecting rods are I-beam section drop forged steel, 10¼ in. center to center. The lower bearing is 2¼ in. in diameter, 2⅜ in. long, and is made of die cast Parsons white bronze. The wrist pin bearing is 1 in. in diameter, steel tubing, held in place with ⅜ in. clasp bolt and lock washer. The pistons are of gray iron 5 in. long, fitted with three lapped rings, 5-16 in. wide. The valves are drop forged steel, 1¾ in. in diameter. The cam shaft is a one-piece drop forging, hardened and ground, supported by three imported annular ball bearings. The crank case is of aluminum fitted with a special oil reservoir in the base. The fly wheel is 19 in. in diameter, 2¾ in. deep, fastened to the crank shaft on taper by ½ in. key, held in place by a 1½ in. nut. The Remy high tension magneto dual ignition system, with non-vibrating coil, is used. The valve stems are enclosed but are easily accessible by simply removing two ¼ in. wing nuts. The oiling system is integral with the motor, and is a combination of the splash and force feed types. The bearings throughout are of the annular ball type.



The Lambert Motor

The above illustration shows the right side of the Lambert motor. This motor is rated at 35 h.p. and has a bore of 4⅛ in. and a stroke of 4½ in. It is cast en bloc and is three point suspended.

A feature of the motor is the flexible coupling between the motor and the transmission, thus allowing the car to be thrown into any sort of a twist without binding a single bearing. This coupling consists of a disc wheel connected to the motor by means of four flat springs. The motor is mounted on three point suspension.

The Lambert Two-Ton Truck With Panel Body

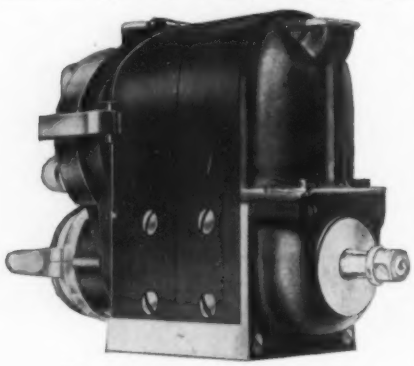
This illustration shows one of the latest jobs completed by the Buckeye Manufacturing Company; namely, a two-ton truck with all-panel body. The tires are 36 x 3½ in. front and 36 x 5 in. in the rear, solid rubber

TRUCK ACCESSORIES AND APPLIANCES

TYPE "ZR" BOSCH MAGNETO

The advantages claimed for the "ZR" magneto are: increased efficiency, freedom from troubles due to water, dust and oil, greater simplicity in timing, greated immunity from accidental injury, a wider range of adaptability and noiselessness. The following description of the instrument serves to make clear the construction employed in obtaining these advantages.

In place of three double magnets, the type "ZR" has but two single magnets, but by rearrangement and refinement of design the "ZR" magneto will give a spark at a lower speed than the type "D," thus permitting engines to be started at lower cranking speeds or to be run under more closely throttled conditions.



The Bosch Type "ZR" Magneto
This view shows the driving end. Attention is called to the smooth outside appearance and the all-enclosed feature.

In appearance the "ZR" magneto differs very greatly from the "D" and "DR" types, which it supersedes, and, with the exception of the necessary timing arm, is entirely free from all projecting parts. The smooth and curved surfaces prevent the accumulation of water, oil and dust and protect the instrument from injury.

Water, Oil and Dust-Proof

In order to render the instrument proof against water, oil and dust, a protecting hood is fitted at the shaft end of the magneto, the slipring connection and safety spark gap thus being entirely enclosed. The hood is practically a continuation of the end plate and beside fitting snugly against the magnets, is provided with special packings that insure a tight joint. By a similar method, foreign substances are prevented from entering at the joints between the two magnets. The distributor plate is fitted to the opposite end of the magneto so that there, too, is a tight joint, sealing the space under the magnets completely against the entrance of any foreign substance.

The heavy oil covers have rounded, overhanging edges that compel injurious substances, such as water or gritty oil to flow free of the lubricating ducts, thus preventing damage to the bearings. It is also noticeable that the parts of the circuit breaker housing have very large bearing surfaces, which is practically a guarantee against wear and consequent loosening of these parts.

The Distributor Connections Are Waterproof

The binding screws of the high-tension distributor, as well as the binding screw for the switch connection, are of a design that prevents the possibility of short circuiting through the action of moisture or dust.

The cables leading to these binding screws are provided with Bosch Loop Terminals, and when in position the shoulder of the binding post fastening screw bears on the end of the insulation, which is thus pressed against the edges of the groove in the deep shoulder that surrounds the screw, making the connection waterproof.

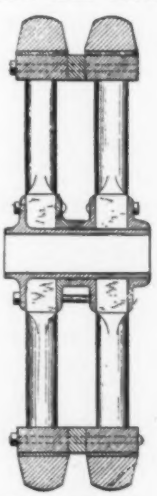
The Timing Mechanism

Where in former constructions the timing arm was integral with the circuit breaker housing, in the "ZR" type it is separate and can be set at any desired angle. The timing of this magneto may be accomplished without the removal of any of the parts.

The "ZR" magneto is produced for four and six cylinder engines either in independent or in dual form, for single spark and for two spark ignition.

This new type magneto adaptable especially to motor trucks was designed and is made by the Bosch Magneto Company, 223-225 West 46th Street, New York, N. Y.

A DUAL-TIRE WHEEL FOR COMMERCIAL CARS



The Dual-Tire Wheel

The illustration shows a dual tire wheel comprising two wooden felloes with interposed spacing blocks and connected by clamping bolts. Two sets of spokes are fitted perpendicularly within the two felloes and tapered at the inner ends to form a solid mass of wood. The spokes and felloes are bored the same for both sets, spacing-flanges being fitted between the sets of spokes at their bore, while flanges fitted outside of the spokes and bolts extend to the four flanges to clamp them together.

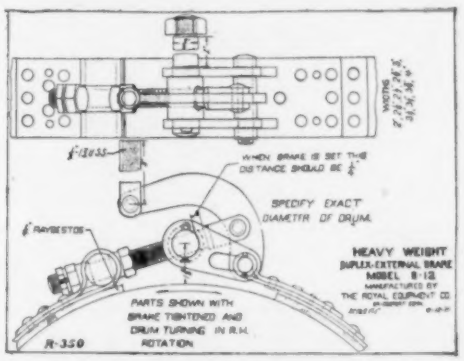
This new way of making wheels, giving support to each tire by spokes, is claimed to do away with much trouble that was caused by such a large felloe being placed on a single row of spokes.

This new type of dual wheel is manufactured by Phineas Jones & Company, Newark, N. J.

DUPLEX EXTERNAL BRAKE

The Duplex brake is made for automobiles, trucks and for many types of machinery. It operates on the wrapping or winding principle. One end of the flexible band is fixed while the operating force is applied to the other end in the direction of rotation of the drum.

The braking effect is equally powerful whether the drum is rotating backward or forward. By automatic control either end of the brake becomes the fixed end in proper relation to the movement of the drum. When the Duplex brake is applied it grips without drag or chatter. Slight pressure, it is claimed, produces full, even braking effects on the continuous band and drum, thus insuring uniform wear and uniform strength throughout the life of the brake.


WHEN BRAKE IS SET THIS DISTANCE SHOULD BE
SPECIFY EXACT DIAMETER OF DRUM.
RAYBESTOS
HEAVY WEIGHT DUPLEX-EXTERNAL BRAKE MODEL B-12
PARTS SHOWN WITH BRAKE TIGHTENED AND DRUM TURNING IN R.H. ROTATION
R-350

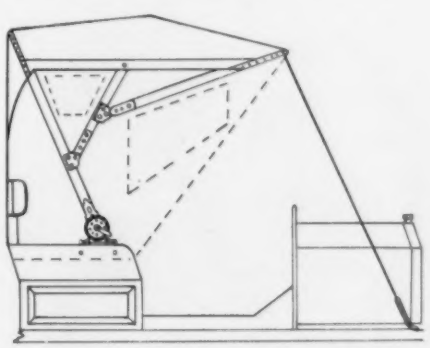
Detail Views of the Duplex Heavy-Weight Brake

The Duplex heavy external brake is specially made for ambulances, police patrols and heavy types of cars in commercial service. They operate in the same manner as standard Duplex brakes, but their construction is much heavier.

These brakes, as just described, come lined with Raybestos or Stability lining and in prices depending upon diameter and width, and are manufactured by the Royal Equipment Company, Bridgeport, Conn.; also manufacturers of the "Gyrex" mixer or gasoline economizer and Raybestos brake lining.

A SPECIAL TOP FOR COMMERCIAL VEHICLES

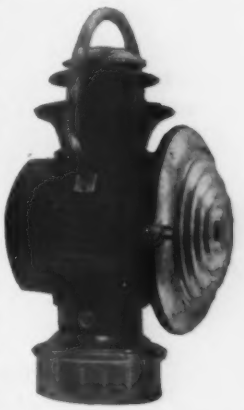
The accompanying illustration shows a top designed especially for motor trucks. The top is of a very snappy and up-to-date appearance, and at the same time is designed with a view toward meeting the demands for strenuous commercial vehicle service. This top gives a maximum amount of space in front of the bows, for the purpose of sight; convenience in handling the levers; ease in getting in and out, and perfect protection to the operator from the elements. The top is made strong and substantial with plain wood bows, covered with Pantasote, imitation leather, brown waterproof duck or black oiled duck, and is held in place in front by cables and springs. This top is manufactured by the Buffalo T. & T. Company, of Buffalo, N. Y.



The Buffalo Top for Commercial Vehicles
Dash Lines Represent Curtains

KNICKERBOCKER COMMERCIAL CAR LAMPS

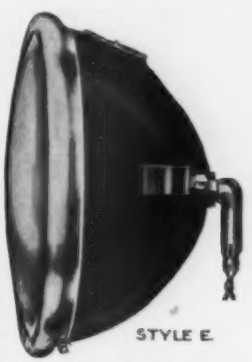
The illustration shows a lamp built expressly for commercial vehicle service. The lens used is claimed to give a maximum quantity of light. Combination props are attached to fit any bracket. This lamp burns oil, and is fitted with a large oil front, secured by a holdfast device. The finish is black enamel with brass trimmings. This model is 14 in. in height, and lists at $14 a pair. It can also be furnished with electric attachment if desired. This lamp illustrates one of many styles made by the Knickerbocker Brass Goods Company, 124th Street and 1st Avenue, New York City.



Knickerbocker Model 50-0 Commercial Car Lamp

THE MILWAUKEE TRUCK LAMP

The Milwaukee Bronze Casting Company, of 119 Clinton Street, Milwaukee, Wis., has recently placed on the market a lamp built especially for commercial vehicle service. The lamp is lighted by electricity, and is equipped with the Edi-swan bayonet catch base. The lamp is made especially heavy to withstand the excessive vibration on a truck, the material being cast metal, and is about 3-16 in. thick. The elbow connector, which is clearly seen in the cut, contains all the electrical equipments. The lamp is focused by loosening the lock nut, and giving the same a turn forward or back. The lamp is fitted with a convex lens, which is laid in rubber, making for durability, water, air and dust-proofness. This lamp is made in five sizes having 6, 8, 9, 10 and 12 in. reflectors, and listing at $15 to $32.



Milwaukee Truck Lamp

Somewhere in this issue there is a heading, "Information Bureau." Under this heading we publish questions and answers on any subject pertaining to the commercial car industry. If you have any perplexing problems confronting you, do not hesitate to write to us. We will give you all the information we can. Address the "C. C. J.," Forty-ninth and Market Streets, Philadelphia, Pa.

Uncle Sam Trying Out New Method of Collecting Mail

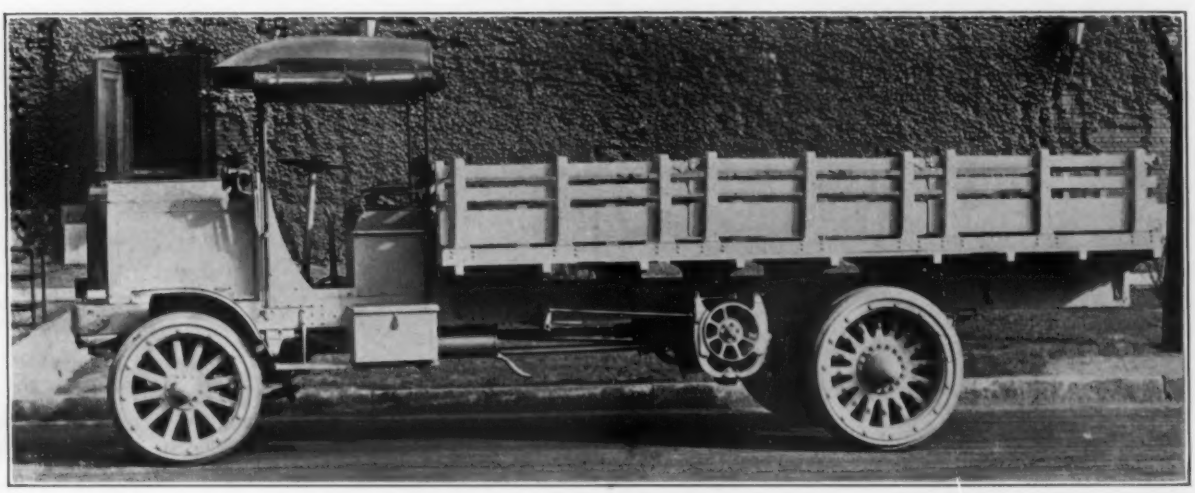
Collecting The Mail

The center illustration shows the car brought to an abrupt stop directly in front of the letter box. The operator unlocks the box and the lower part of the mail box opens down, the van side drops outward, and the mail is instantly deposited into the van. Both covers close automatically and the car is instantly on its way.

PROBABLY the most noticeable step taken recently by the Post Office Department to further the quick collection of mail from street boxes, is that of testing out Tricars as a means of shortening the time consumed. It is claimed that with these machines the efficiency of the service is increased 50 per cent. in addition to a great saving.

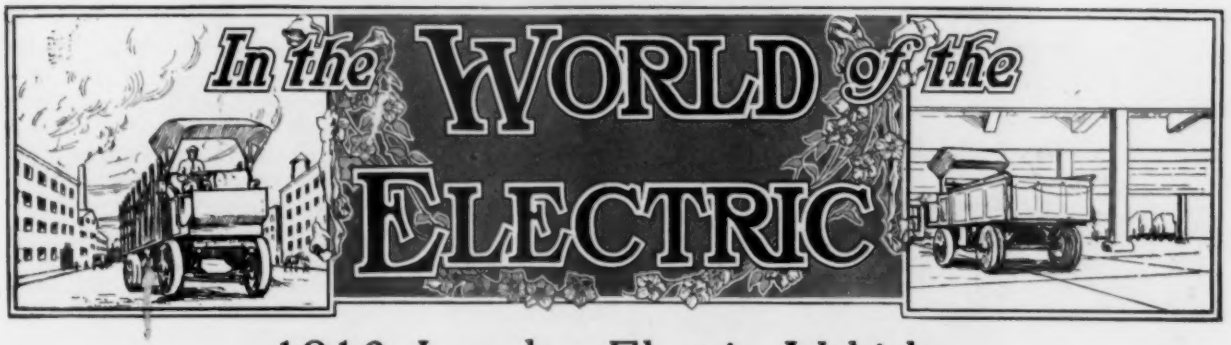
For some time past, test after test has been undertaken of all conceivable methods of transportation to bring about the point of perfection in the collection of mails from street mail boxes. The other branches of service had been worked out to a point of perfection. Automatic machines were purchased and installed for the sorting of letters and cancelling stamps; railroad mail service was worked out to a fine point; distribution was absolutely perfected; but the actual collection from street boxes was still a question to be solved.

Knowing the difficulty in endeavoring to find a suitable method for collecting the mails, the Minneapolis Motor Company, of Minneapolis, Minn., called the attention of the Post Office Department at Washington to the desirability of using its tricars in this connection, and subsequently, a test was authorized and in the course of this test it was proven conclusively that the tricar would cover the territory in a short time and at an extremely low cost. It is suggested that such cars be used throughout the country.



The New Five-Ton Packard With Low Stake Body

Here is presented a view of the new large five-ton Packard truck. The low stake body is peculiarly mounted on the five-ton chassis, and has removable sections. Note the heavy brake shoes applied on jack-shaft brake drums



1913 Lansden Electric Vehicles

THE product of the Lansden Company, of Newark, N. J., is of interest not only because of the fact that this company may be considered pioneers in the electric truck field, their first machine having been placed on the market in 1904, but because these vehicles show original thought in both design and construction. The Lansden 1913 models are anything but stereotyped. It is safe to say that the long experience of this company has been embodied in tangible form in the 1913 product.

Practically all the models are based on the same general design, variations consisting only in size and weight of parts rather than any change in the design. The vehicles range in carrying capacity from 750 lbs. up to 10,000 lbs., the intermediate sizes being of 1000, 2000, 4000 and 7000 lbs. capacity.

Features of Chassis Arrangement

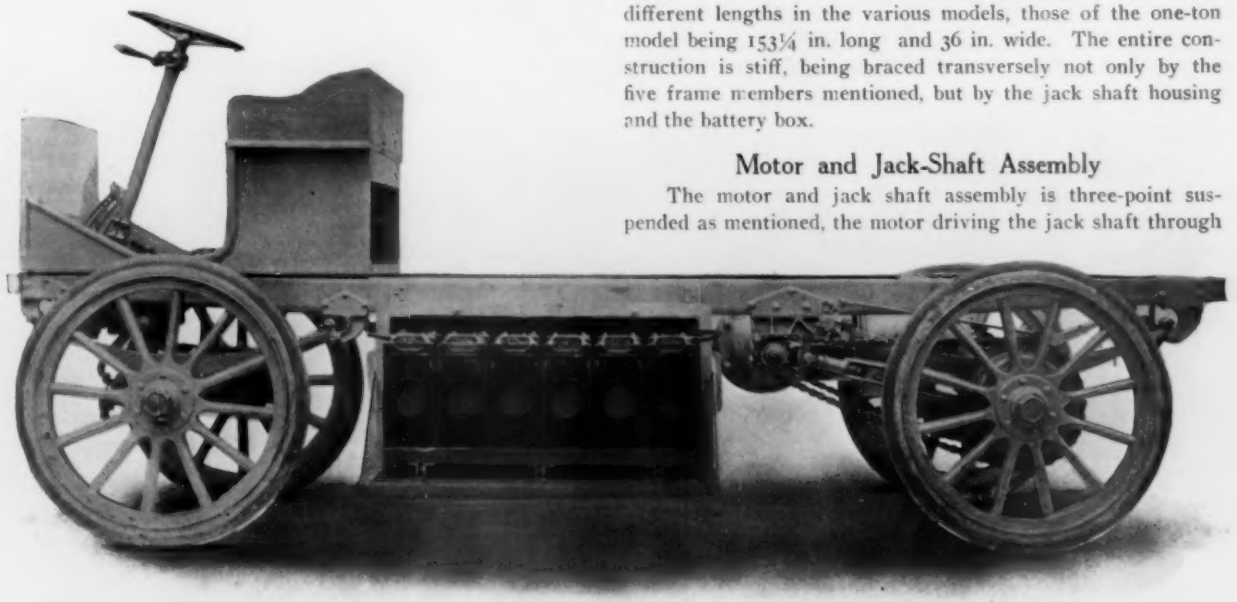
Before going into the details of construction, the general chassis arrangement, which can be clearly seen by reference to the accompanying one-ton chassis plan view, will be mentioned. The location and method of power transmission from the motor is unique. As shown, the 60 volt 40 ampere, series wound General Electric motor is suspended just forward of the rear axle, with the armature shaft lengthwise of the vehicle frame. This special motor, which is claimed to be capable of a 300 per cent. overload continuously for thirty minutes, forms by means of its housing, a unit with the jack shaft, the combination of motor and jack shaft being three-point suspended from the frame. The drive is then to the rear wheels from the jack shaft sprockets by 1¼ in. pitch Whitney roller chains. The chain distance is maintained by special radius rods. Briefly, the other features are, an underslung 60-cell Edison battery, in a special metal cradle, having features of accessibility not commonly found, and which will be described later, and a special locking control lever, the worm and sector steering gear, and continuous torque type controller.

The Frame

The frame is of cold pressed steel, heavy channel section, with five channel section cross frame members with integral gusset plates. All parts are hot riveted, and double heat-treated. The rear ends of the side frame members extend slightly beyond the rear cross frame member, and these frames are of different lengths in the various models, those of the one-ton model being 153¼ in. long and 36 in. wide. The entire construction is stiff, being braced transversely not only by the five frame members mentioned, but by the jack shaft housing and the battery box.

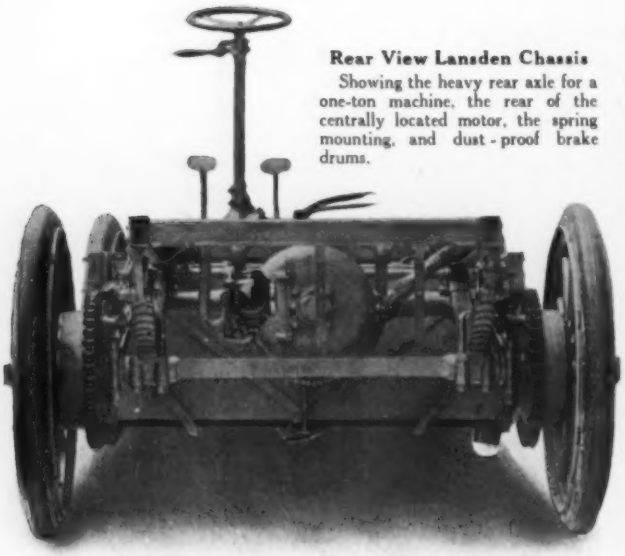
Motor and Jack-Shaft Assembly

The motor and jack shaft assembly is three-point suspended as mentioned, the motor driving the jack shaft through



Side View of the Lansden Chassis

Attention is called to the battery, partly pulled out on its rollers on the shelflike sides of the battery cradle. The combination casting which supports the jack shaft, forward spring shackle and transverse brake shaft, is also clearly shown



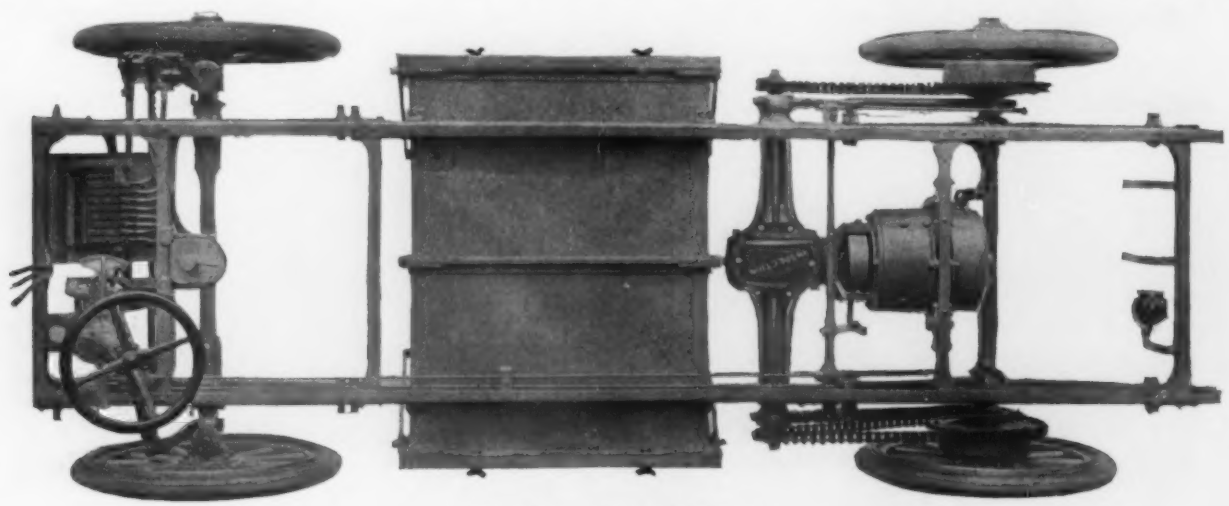
Rear View Lansden Chassis

Showing the heavy rear axle for a one-ton machine, the rear of the centrally located motor, the spring mounting, and dust-proof brake drums.

a spur and bevel gear reduction, the bevel pinion being mounted directly on a prolongation of the forward end of the armature shaft. The motor and jack shaft differential housings are rigidly connected, and held in alignment, the portion between being enlarged to contain a powerful, contracting, fabric-faced service band brake, operating on a drum directly on the armature shaft. A hand hole plate makes possible the adjustment and renewal of this brake, without interfering with or disturbing either the jack shaft of the motor. The jack shaft housing is similar to the rear axle construction of a bevel gear driven car. The shafts proper are nickel steel and self-aligning. The housing is as usual in three sections of heavily ribbed cast aluminum, the center section forming the bevel gear differential housing, and is provided with a top removable plate for inspection, and at each side with smaller hand hole openings for adjustment. All parts run in lubricant, there being an efficient stuffing box interposed between the jack shaft and brake housing. The motor and jack shaft assembly are supported at three points. The motor is hung from a reinforced channel section, pressed steel, cross frame member by means of a cast steel yoke, the cylindrical motor case resting in brake shoe like castings, fitted with heavy fabric pads. The jack shaft is mounted at its outboard ends in cast steel combination hangers, which also support the forward spring shackles of the rear springs, and the transverse brake shaft. No springs or other flexible media are interposed between the motor and frame, other than the pads before mentioned, these giving, in combination with the three-point suspension, all the flexibility of mounting necessary. The motor armature is mounted on Hess-Bright ball bearings, while the jack shaft bearings are Timken rollers throughout. A double reduction is given by the bevel pinion and gear and by the side chains. The chains mesh with large sprockets integral with the rear wheel brake drums, which in turn are a part of the hub castings. The sprockets are especially heavy for the duty imposed, and are proportionately long-lived. The chain distance is maintained by well designed, adjustable cast steel radius rods. The rod ends constitute universal joints, with straplike connections to the rear axle and jack shaft, so that the centers of the radius rod ends are coincident with the centers of the rear axle and jack shaft. The adjustment of rod length is locked by suitable nuts, and in addition to a construction at each end equivalent to a universal joint, there is a taper connection between the main rod and its forward end, which allows for a bearing-like rotation of the forward end in the main rod, thus all possible movements are well taken care of.

Brakes and Interlocking Mechanism

The service brake on the armature shaft is approximately 8 in. in diameter and 3 in. face, and this is controlled by a service pedal of receding type at the right of the steering post. It is supplied with a special interlocking mechanism which is connected to the controller, so that the act of applying the brake automatically cuts off the current to the motor just before the brake acts. When the brake is set, the controller cannot be operated. This exclusive feature of the Lansden prevents overheating and fires, due to leaving a car with the brake set and the controller in, and prevents waste by braking with the current on. The emergency brakes on the rear wheels are dustproof encased, cam operated, expanding bands,



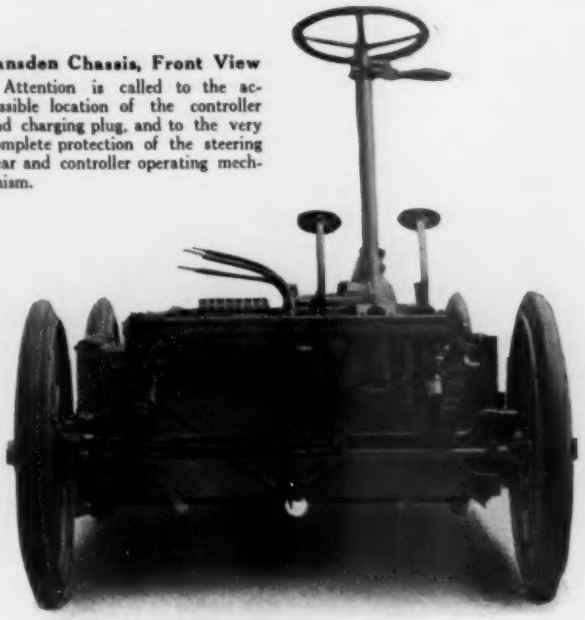
Plan View of Lansden Chassis

Showing the general arrangement of the parts. The control mechanism at the extreme front, the motor and jack-shaft assembly three point suspended, and the battery cradle at the center

controlled by a pedal of receding type at the left of the steering column. The emergency brake pedal is automatically ratchet retained, but can be instantly released by pressure on a foot release button. All brake rods run parallel to, and within the frame line to the transverse brake shaft, from arms at the end of which, rods run parallel to and outside of the frame to the rear wheel brakes.

The Battery

Current is supplied in the one-ton standard equipment by 60 cells of Edison, type A, this battery having a capacity of 225 ampere hours. This is underslung in a special steel cradle with alumaloid covering, and with insulating lining, and is arranged for side loading. The battery is divided into two parts, so that half can be removed at each side of the truck. The sides of the cradle are hinged, and swing downward and outward forming shelves supported by wrought iron brackets. The battery halves are in frames mounted on small steel rollers, so that with one finger the battery can be pulled out on the shelf-like sides of the cradle, which are provided with channel section tracks to receive the rollers. This arrangement greatly facilitates battery handling, saving much time in the garage.

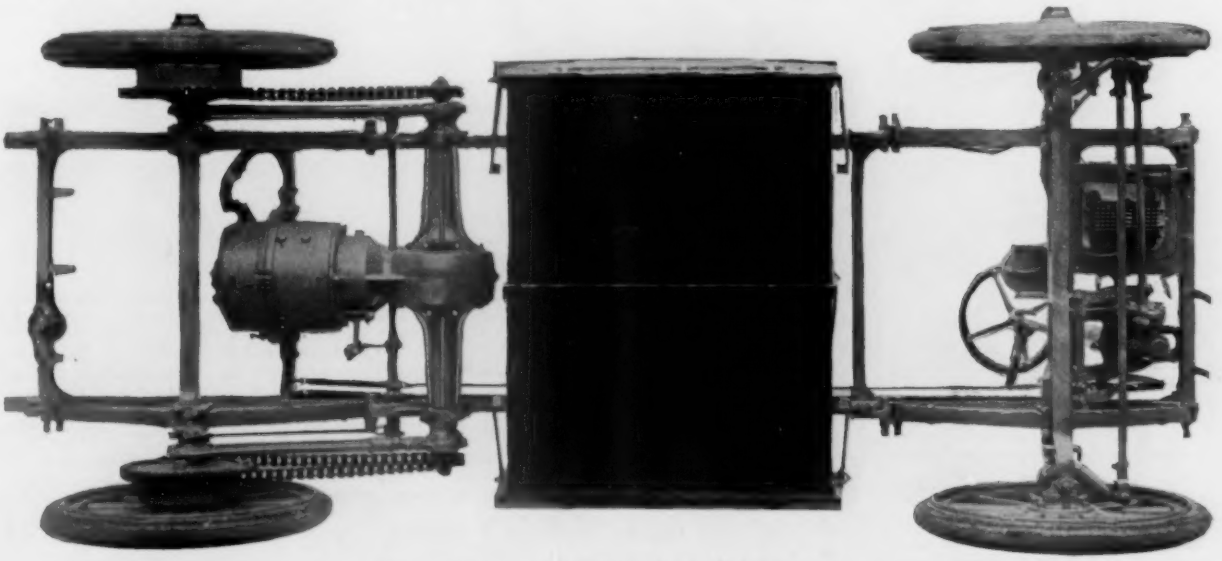


Lansden Chassis, Front View

Attention is called to the accessible location of the controller and charging plug, and to the very complete protection of the steering gear and controller operating mechanism.

The Control

Novel features are everywhere to be found on the Lansden vehicles, but none are more prominent than the arrangement of the controls. Steering is by 16 in. hand wheel at the left, with inclined post. The worm and sector are steel encased, oil and dustproof, and operate in lubricant. The controller tube and brake pedals are carried by a casting with bell-shaped cap, giving additional support and protection. The cross link is forward of the front axle, its ends fitted with yoke connections. Also mounted at the front in a steel case is the eight-finger, continuous torque type controller, giving four speeds forward and two reverse. This is operated by a handle mounted on the steering column, under the steering wheel, as shown in the accompanying illustration. Forward motions in the arc of a circle give successively the forward speeds, the lever being notch retained in each speed. In order to pass into the reverse, the lever must be slightly lifted upward, thus providing a safety device, preventing accidentally throwing in the reverse. A novel locking method is provided; by reference to the accompanying illustration it will be seen that there is a hole "a," and when handle "b" is raised to the position shown by full lines, a hole in the movable part of the handle lines up with the hole "a" in the stationary part, and a padlock can be inserted. In this position, end "c" of the control lever is in such a location that it cannot be moved either forward or backward, owing to prongs "d" and "e," thus locking the control lever in neutral. The resistance is of street car type, extra heavy cast grid mica insulated. This, together with the battery cradle, and the three-point suspended motor and jack shaft assembly, are patented features of the Lansden trucks. A concentric contact type charging plug is arranged accessibly at the front in the normal design, although it can be located else-



View of the Under Side of the Lansden Chassis

This shows the bottom of the battery cradle, also the under side of the control mechanism at the front, the axles and spring retaining bolts

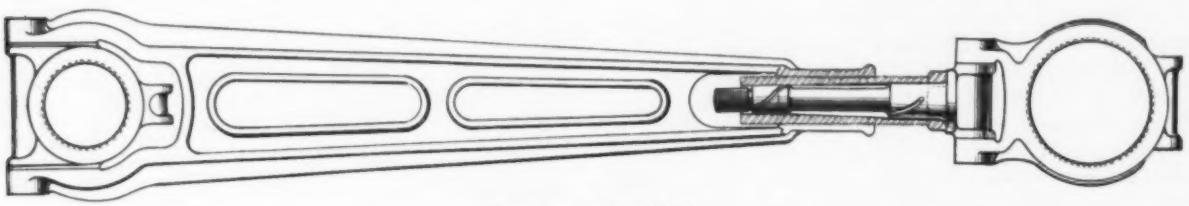
where if desired. The controller is mechanically operated by an arm at the bottom of the steering column, the end of which forms a bevel gear sector, and meshes with a bevel gear on the controller shaft. All parts are substantially made, well supported, and provided with suitable bearings. The safety switch peculiar to the Lansden vehicle, is the same as on former models. It has a large overload capacity, and is operated by a removable key when in the charging or open circuit positions, the key remaining in the switch, however, when thrown into vehicle operating position.

Axles, Wheels, Springs

The front axle is a die forging of I-section double heat-treated, fitted with Timken roller bearings. The steering spindles, also drop forgings, are provided with Timken roller bearings at their upper ends. The entire construction is unusually substantial for a one-tone machine. The rear axle is a heavy nickel steel forging of square section in the one-ton model, and rectangular in the larger sizes. It is also fitted with Timken roller bearings. The wheels are all heavy artillery type, with hubs and brake drums integral as before mentioned, giving a construction which cannot loosen up on account of braking stresses. These wheels are fitted with 36 x 3 in. front and rear Gibney solid tires. The springs are semi-elliptic, both front and rear of chrome manganese steel, oil tempered. The front are 2 in. in width, eight leaves, 35 in. center to center, mounted on the upper side of the axle without center perforations. They are shackled at the rear to cast steel hangers. Spring eyes bronze bushed, bolts hardened and ground, and all fitted with grease cups. The rear springs are also 2 in. in width, approximately 38½ in. center to center, shackled both front and rear, banded and mounted on top of the axle. The wheel base is 106 in., gage 56 in.

Accessories

The horn is of bulb type, attached to the steering post. An ampere hour meter of Sangamo differential-special-heavy-truck-type is supplied; also, a hub type Veeder odometer; at the rear on a bracket over the cross frame member is a heavy commercial type electric tail lamp. Twelve feet of special cable is supplied with the charging plug. All wiring is flexible standard rubber covered cable, of double normal current carrying capacity. It is protected by special wrappings, insulated and varnished, and is laid within the channel of the side frame members, where it is accessible, yet protected.



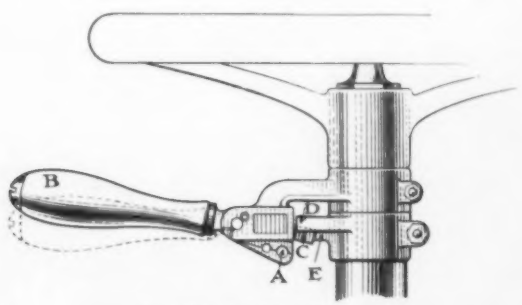
Lansden Radius Rod

A steel casting with universal joint ends and in addition a swivel motion caring for all relative movements of the axle and frame

Bodies and Prices

All types of bodies to suit customer's requirements are supplied. The normal dimensions of the carrying space of the one-ton body are 114 x 45 x 60 in. The bodies are of high grade construction and finish, leather trimmed. The approximate weight of the one-ton truck complete is 4250 lbs. The battery is guaranteed to give under average working conditions sixty miles on a single charge and higher mileages are often obtained.

The prices are as follows: One-ton chassis in the lead f. o. b. Newark, N. J., $2775; with platform body, finished and lettered, $2925; with express body, $3050; with cage body, $3100; and panel body, $3175.



Lansden Locking Control

The control lever "B" when raised to the position shown in full lines, can be locked by a padlock through hole "A," in which position the end "C" engages prongs "D" and "E," preventing the lever from being moved from neutral position.

Fleet of Twenty Waverley Electric Light Delivery wagons, in Service of the Fleischmann Yeast Company, of New York. This fleet is a part of the Fleischmann Company's Waverley Electric equipment, and there are twelve trucks from one to three tons, on order, or in use in Baltimore and other Eastern cities. The majority of these cars have been in use for the past eight months and are doing their work consistently and economically.

Johnnie Jones and his sister Sue once ate a green apple—
Their excuse was, "didn't know"
There are a lot of Johnnies using horses for the same reason

The Standardization of the Electric Vehicle*

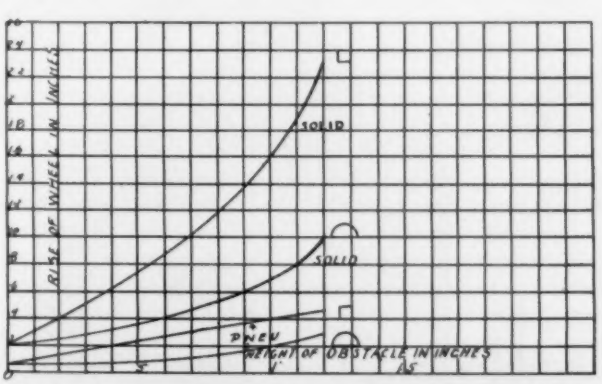
Speed of Vehicles

THE speed of the electric vehicle has been increased from year to year. And the real cause for this increase is not that the engineer of any one company has found some new battery, motor or tire, but because the salesman finds it easier to dispose of a car which will go faster than that of his nearest competitor.

Now the real claim for the electric pleasure or passenger vehicle is that it is so simple, reliable and easy to operate that any child or woman can run one.

But when you stop to consider that one of these glass-enclosed vehicles weighs approximately one ton and a half, with passengers, and is capable in some cases of making 25 miles on good level roads, do you not think that the speed is too high for the vehicle to be properly controlled by a woman or a child? Twenty miles an hour I consider very fast, yet the braking strain is 56 per cent. greater at 25 miles than at 20 miles, and I have noticed in many cases that the braking mechanism has not been increased in proportion to the increase of speed.

I have talked this matter over with many of the older and long-established manufacturers and they would welcome some standard maximum speed, providing that the different companies would stand by it.



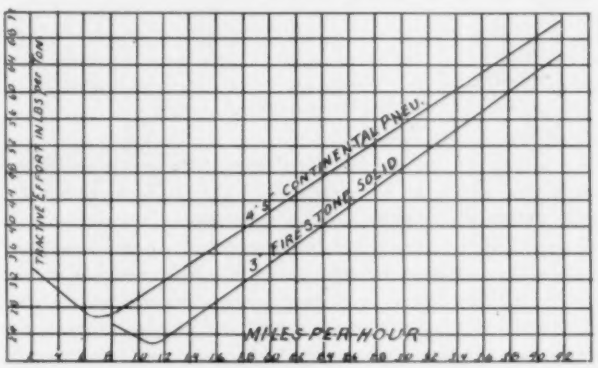
Curves Showing Vertical Lift of Axle With 2½ in. Solid Tire and 4½ in. Pneumatic. Speed 15.5 m.p.h. Load on wheel, 1100 lbs.

Now in regard to the effect of speed on the energy consumption of a vehicle: At first our tests were made with the ordinary voltmeter, ammeter and stop watch over a measured course. These were not entirely satisfactory, so that we had to design and build a graphic recording instrument.

The instrument is of the graphic recording type, recording simultaneously the amperes, voltage at the motor or battery terminals, depending upon connections made; the revolutions of the front wheels and a chronometer attachment so that the time and number of revolutions are accurately recorded.

Besides giving the exact readings at any one time, it is also indispensable for making acceleration tests as it shows the variation of volts, amperes, and speed during the time required to move the vehicle from rest to full speed.

From tests made on the road and the dynamometer that we are able to obtain from accurate results and by combining the road tests with the dynamometer tests, we are able to ascertain the various losses due to tires and windage.



Test on One-Ton Standard Express Wagon on Level Macadam. Average of readings taken by G. E. Recording Instruments. Gear ratio constant. Variations in speed controlled by number of cells connected.

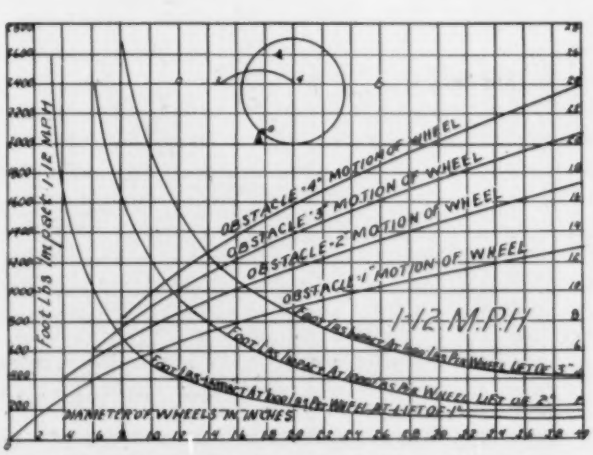
From these tests you will note that the power required rises very rapidly as the speed is increased over 17 to 18 m. p. h.

This is true even with large cars weighing 16 tons and designed to run on rails.

We all know that for city and for moderate hauls that the electric vehicle has arrived, due solely to its reliability and low maintenance. And the one reason for this is the moderate speed at which it operates.

The effect of high speed for commercial vehicles fitted with solid tires is well shown by the curves I plotted from tests made by Michelin.

You will notice from the curves that there is a critical speed at which the minimum tractive effort on draw


FOOT LBS IMPACT 1/12 M.P.H.
OBSTACLE "4" MOTION OF WHEEL
OBSTACLE "3" MOTION OF WHEEL
OBSTACLE "2" MOTION OF WHEEL
OBSTACLE "1" MOTION OF WHEEL
1-12 M.P.H.
DIAMETER OF WHEELS IN INCHES

Height of Obstacle Solid Tire and Lift of Axle With Elastic Tire

*From a paper read by Alexander Churchward before the Electrical Vehicle Association of America at the Third Annual Convention, Boston, Mass., October 8-9, 1912.

bar pull occurs and that it varies with the type of tire used. The same effect has been observed and demonstrated in connection with rail traction. In each case, it is due to wave motion, wave motion in the rolling surface.

In the case of the automobile, it is caused by the kneading of the tires.

With rail traction, the same result is due to the waving of the surface of the rail. It is also affected by the chord of tread of the tire. The effect of the chord of tread is very nicely illustrated in cut made on dynamometer and varying the chord of tread by increasing and decreasing the pressure in the pneumatic tire used in the test.

Therefore, the minimum tractive effort shown in these curves will be influenced,

1st.—By the diameter of tire.

2nd.—By the load on tire.

3rd.—Speed of the tire.

4th.—Composition of the rubber.

5th.—By the chord of tread.

If any of you are interested enough to watch the action of a rubber tire at low speeds and also at high speeds you will notice that there is quite a different conformation of the front side of the tire at various speeds.

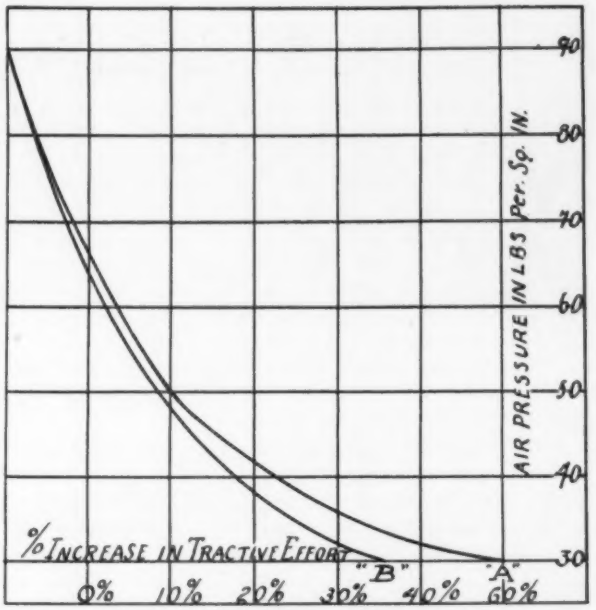
At the summer meeting of the S. A. E., 1909, I read a short paper on the energy consumption of vehicles and gave a table of speeds for various weights of cars as follows:

GROSS M.	TIRES	M. P. H.
1500	Pneumatic	20
2000	Pneumatic	20
3000	Pneumatic	18
4000	Pneumatic	16
2000	Solid	16
3000	Solid	15
4000	Solid	13
5000	Solid	11
7000	Solid	9
10000	Solid	8
15000	Solid	7
20000	Solid	6

Within the last month I have again taken this matter up with a number of manufacturers and a compilation of their speeds is given below:

CARRYING CAPACITY	SPEED, MILES PER HOUR
1000 lbs.	12-13
2000 lbs.	10-11
3000 lbs.	10
2 tons	8-9
3 tons	7-8
4 tons	6.5-7.5
5 tons	6-7
6 tons	6.5

A three-ton truck to compete successfully with horses does not have to run at touring-car speeds. The average speed of a three-ton horse-drawn truck will be about 2.5 miles per hour, and the mileage not over 12 to 15 miles per day. Therefore a three-ton truck running at 7.5 miles per hour will compete very successfully with the horse-drawn vehicle, and its maintenance will be low.



Curves Showing Increase in Tractive Effort in Percentage Due to Deflation of Tires. Curve A—Average speed 10 m.p.h.; Curve B—Average speed 19 m.p.h. Tires 30 x 3½; weight of car 2100 lbs; normal air pressure 60 lbs.

You must keep the maximum speeds down to such a point that the electric vehicle will continue to hold the position it does today.

Advertises Product With Electric Lights

The accompanying illustration is of a one thousand pound Detroit Electric delivery wagon with panel body, used by a baker at Tacoma, Wash. It will be noted that the roof of the vehicle is fitted with wire screens and that at each of the four corners and at the middle of the roof electric lights are used, resembling a ship's lamps. This idea of advertising after dark, while perhaps not original with this concern, is nevertheless unique, effective and inoffensive. Obviously, as the car comes down the street brilliantly lighted, it is sure to attract attention. It is equipped with a sixty-cell Edison battery.

Quick Loading and Unloading

BY OUR FOREIGN CORRESPONDENT

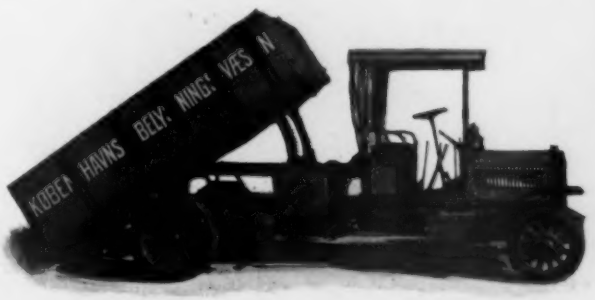
IT IS perhaps rather surprising that more has not been done in the way of quick action and power operated devices, both for loading and unloading, seeing that the engine of the car is always available. Frequently the main underlying reason for this is the extra expense, but after all this need only amount to a comparatively small sum, that can soon be recouped by the saving of time in loading and unloading, for the loss due to trucks, standing idle during loading and unloading, may total a very considerable amount during a full year's work, not considering the driver's loss of time, which also has to be paid for. In America where time is even more a question of money than over here, the quick loading and unloading proposition is probably more developed than in Europe, but the methods we have on this side of the water may not be without interest to American readers.

Modern facilities for dealing mechanically with the loads of commercial cars practically group themselves under two heads—those for unloading only and those that can be used for both loading and unloading.

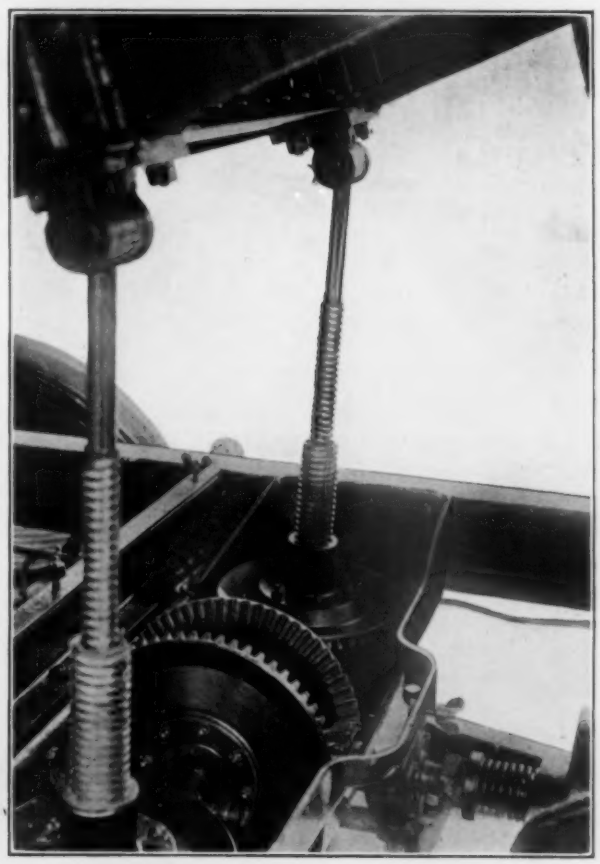
Taking the simplest first, these devices practically resolve themselves into tipping devices, operated either by hand or engine power, but although the former method is often adopted for end tipping, it is seldom, if ever, applied to side-tipping trucks, the difficulties in the way being obvious.

In end-tipping trucks, if it were possible to balance the body at the middle and always load equally, a comparatively light hand gear would be sufficient, but in ordinary automobile design it is seldom possible to obtain such conditions owing to the necessity for carrying the frame members back; consequently the tipping body has to be pivoted considerably nearer the rear end as a rule.

A most usual design of end-tipping gear worked by hand is shown by an accompanying illustration. In this the ordinary end-tipping gear consists essentially of a screw pivoted at its lower end, so as to accommodate itself to varying angles and working in a nut secured on trunnions to the body of the vehicle. The lifting screw is made to rotate by a transverse cranked shaft operated through bevel gear, the



An End-Tipping Trailer Body Lifted by Lever Arms Actuated Through a Geared Quadrant



A Double Telescopic German Daimler Tipping Gear Operated by the Motor

whole mechanism being arranged to swing with the operating screw on its pivot. Rotation of the screw then works the nut upwards along it, and with it the front end of the tipping body, both nut and screw being pivoted, accommodating themselves to varying angles, owing to the fact that both swing on trunnions.

Geared Quadrants

One of the simplest types of tipping gear is afforded by Messrs. Mann's pin rack mechanism, in which the usual lifting screw is replaced by two mild steel pin racks kept in mesh

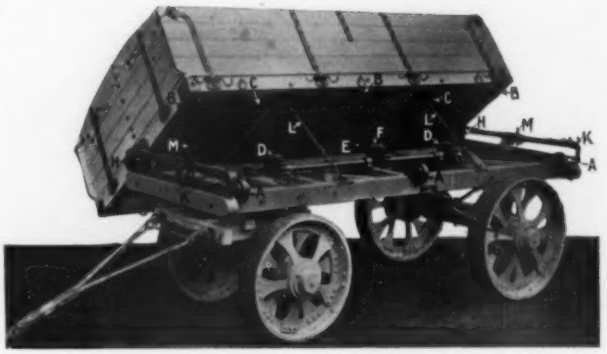
Geared-Rack Tipping Device, as Fitted on a Scheibler Chassis, With Centrally Pivoted Body

by suitable shackles, with tooth pinions secured on a horizontal shaft turned by a hand crank. Besides simplicity no amount of dust or dirt can really interfere with the free action of this gear, as any obstruction of this nature is pushed out of the rack by the teeth coming into engagement.

Another more elaborate modification of the same principle of lifting body, and one often adopted on the Continent, especially in Germany, consists of two massive quadrants secured to the under side of the body and in mesh with tooth pinions rotatable by suitable gearing.

Some Trailer Examples

Some of the best examples of tipping practice are found on trailers. In one end-tipping trailer a cranked handle operated from either side and turning a transverse shaft moves by means of a geared quadrant through a certain angle.



A Trailer Exemplifying a Gear and Rack Form of Side Tipping

This quadrant is on another shaft provided with two heavy arms or lifting levers, and these levers at their ends are fitted with rollers bearing in guides against the under side of the body. As the quadrant is rotated the arms are forced upwards at an angle against the body which they accordingly lift.

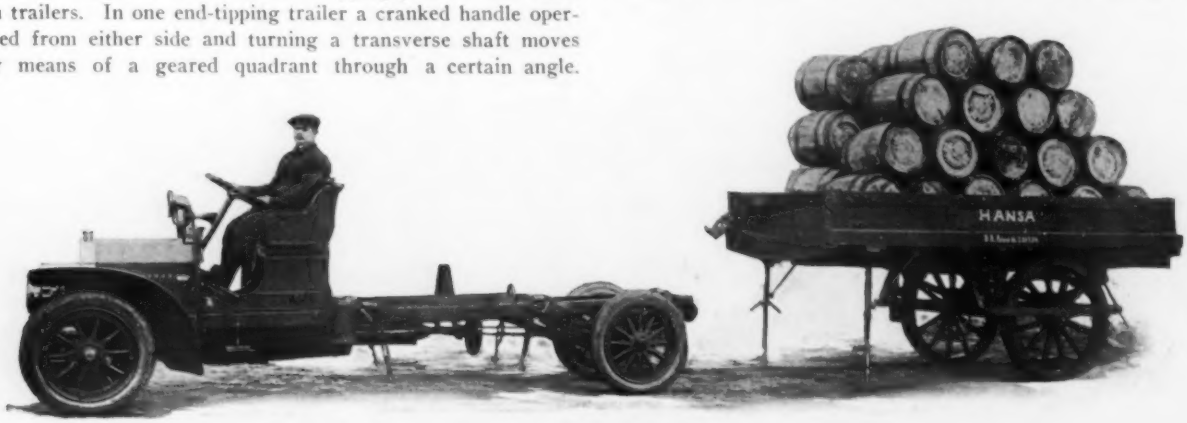
While the engine-operated tipping mechanism costs somewhat more than hand gear, it is, of course, quicker in its action, and as a rule, too, more exact.

Tipping by Engine

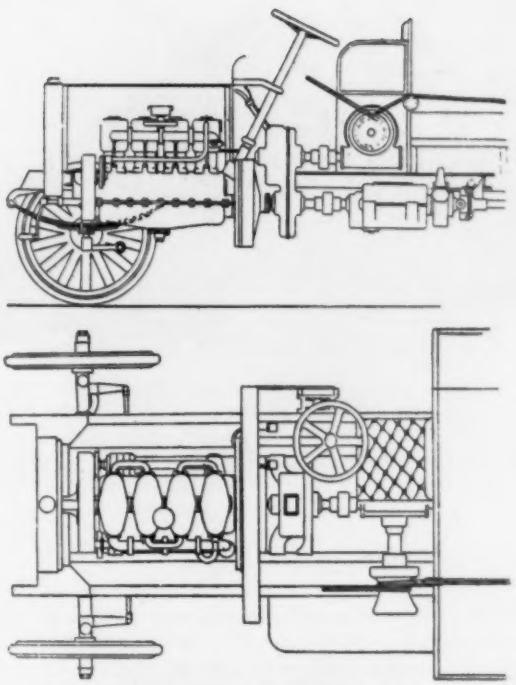
In general, there has been little development in this direction, and, therefore, a neat form of tipping gear was exhibited at the last London show by Milnes-Daimler. In this a bevel pinion on the clutch shaft can, at will, be made to gear with large bevel crown wheels, that by further bevel reducing gear rotate the telescopic screws of the tipping gear, as explained by the illustration.

Side Tipping

As with the end tippers, so in side tipping some of the best examples are to be seen in trailers. An accompanying illustration shows a body carried on rollers, some of which are seen at A, and the under side of its floor is fitted with racks meshing with pinions D on a shaft E, which can be operated from either side by a transverse shaft carrying a worm in mesh with the worm wheel F. By turning this transverse shaft with the crank lever G, the longitudinal shaft can be rotated, and thus the body rolling on the rollers A is worked by the gears to either side until it tips, when it is



Hansa Detachable Two-Wheel Cart Body Detached From Chassis



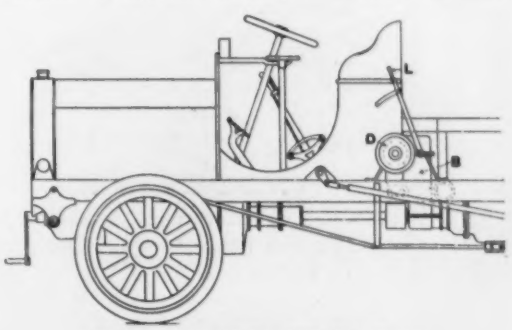
General Arrangement of the Dennis Spur and Worm Gear Winding Mechanism

checked by the stop pieces at H. The angle of the tip is limited by the chains seen at L, and two substantial locking plates are provided at M, to prevent any play when the body is in its normal position.

Another type of side-tipping mechanism shows a similar arrangement; a transverse worm shaft rotates a longitudinal shaft, but here the similarity ceases. For quicker operation when the body is light or partially loaded a second transverse spindle, working at a higher gear, is introduced. The longitudinal shaft at each end is fitted with drums to accommodate chains, which are carried thence over chain pulleys, supported on vertical angle iron frames at each end, secured to the under frame. In normal position the body rests on four bearers consisting of short steel rods supported on either ends in brackets, while other brackets on the underside of the body in a row on each side rest on these rods and constitute the hinges upon which the body tilts to either side. The amount of tipping movement is regulated by means of two curb chains attached to the underside.

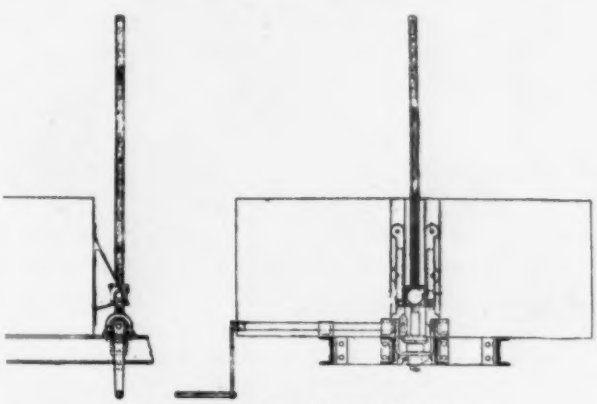
Side Tipping by Compartments

Where the load is best carried in compartments, each to be delivered by separate tipping, as is often the case; for instance, in the coal trade and in municipal work, delivery at the side is practically the only form of tipping possible. With this form of truck the same principle of transversing, by some form of gearing, the compartments to the side until there is sufficient overhang to tip, is commonly adopted, and in this connection a French steam truck embodying this method is shown. In this machine the transverse bearers, along which the tipping compartments are traversed, are sloped at each end to facilitate and graduate the tip.



The Commercial Car Winding Gear

Another side-tipping arrangement by compartments is a modification of a method used in end-tipping trucks. In this a bevel wheel is rotated by a crank handle, and another bevel wheel meshing with the bevel gear is thus rotated, and in its rotation raises the tipping screw as explained pictorially, the whole arrangement being pivoted so as to accommodate itself to the different angularities of the tipping screw.



Screw and Swivel Nut End Tipping

As shown, this can only be worked from one side, but it is so designed as to permit of a shaft being added on the other side also, if required

Winding Gear, Cranks and Detachable Bodies

In Great Britain many of the heavier load capacity vehicles, used for brewers' transport and other work, in which the load is made up of heavy units, employ steam as motive power, and in such cases it is a very frequent practice to extend the engine crankshaft to the side and fit the extension with a winding drum, from which a rope is led through fair leads bolted to the frame members of the car, so that the engine power can be utilized for lowering barrels into cellars, etc. In these steam cars, however, the engine crankshaft generally lies across the frame, but there seems no real difficulty in fitting a winding gear to a gasoline car to even better advantage.

One firm—Dennis Bros., of Guilford—has made rather a point of this, working the countershaft, on which the winding drum is placed by worm gear from a shaft, which in its turn is secured and gear operated from the clutch shaft, as indicated in the accompanying diagram.

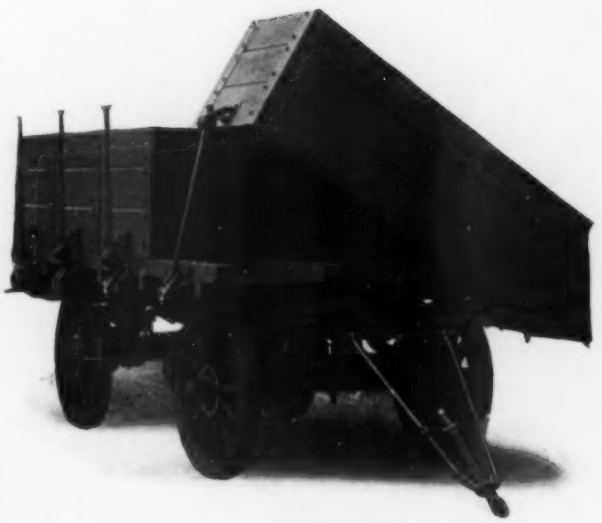
A commercial car firm at Luton has paid considerable attention to mechanical loading devices, and has brought out a winding gear in which the drum on a transverse shaft is driven by gearing from an oil-tight box. The gear in the box is actuated from the propeller shaft, for the cars are countershaft and chain driven, and the propeller shaft lies between the clutch and gear box in their case.

Craning by Compartments

In France for loads that can be divided up into large sized separate units, each in a separate compartment, a motor-driven crane is sometimes employed on the lines indicated by the illustration, which shows one of these vehicles just about to lower one of its compartments by power.

Interchangeable Bodies

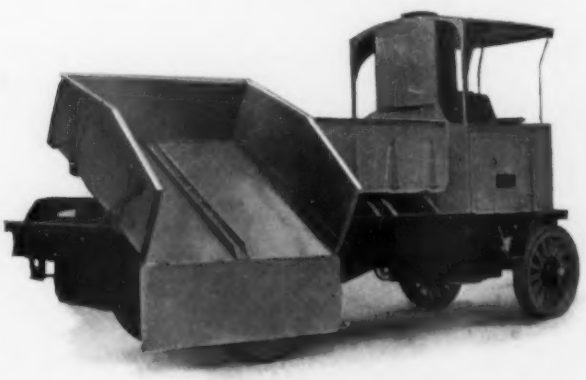
One of the most effective ways of saving time in loading and unloading lies in the use of interchangeable bodies. A firm of furniture makers has workshops and warehouses



A Simple Form of Compartment-Body Tipping by Bevel Gearing

A Gear and Chain System of Side Tipping Applied to a Trailer

in the east end of London and other warehouses at Kingston-on-Thames, some sixteen miles away. Between these two premises it does a lot of transport work, which is carried out by a three-ton Thornycroft truck with removable body. On its arrival at one of the warehouses the load with its body is run off on rollers on to the loading stage, and another body which had been loaded while the car was on the road is promptly run on to the chassis, and the vehicle gets away with practically no loss of time. As the same happens at the other end, the truck is practically always on the road, and the capital which it represents is utilized to the fullest effectiveness. In fact fully two trucks would be required to do the same work were the old methods of loading in force. The working with this car, of course, entails a loading stage, against which the car must back, and the stage must be about the same height as the chassis frame. In another case where such a loading stage is not available a five-ton crane is used very effectively for changing the bodies.



A French Steam Truck Fitted With Double Compartment Side Tips

A Motor-Operated Swinging Crane for Quick Loading on the Compartment System

Platform Body With Rails Laid Along it for Quick Loading

A Detachable Cart Body

A curious example of the detachable idea was sometime ago afforded by the Hansa firm in Germany. In this case the load was carried on a separate two-wheeled cart, that could be attached to or detached from a chassis as required. It is best ex-

plained by the accompanying illustration, which shows the car in use with an ordinary touring car chassis. It will be seen that the front part of the body rests on a large volute spring, on the chassis, and that the body is securely held to the chassis frame by turnbuckles.

A Platform Body With Rails

A less ambitious idea, but one having considerable possibilities, is the fitting of rails on a platform body. In this case the body was fitted to a steam car, and power from a winding drum was available to run in bins on or off the body along the rails fitted. The load, when on, can be held in position by the screw clamps and washers fitted on the rails.

MOTOR TRUCK TRIALS IN FRENCH ARMY

The French Army holds annual motor truck trials to the advantage of every manufacturer, who is able to offer his trucks to the public with the possibility of a subsidy. All the latest types of commercial vehicles are found in the trials. The French Army subsidizes privately owned motor trucks rather than maintain a large fleet of vehicles. By offering $600 at the time of purchase and $200 for each of three following years it is possible to have at the disposal of the Army a large fleet of motor trucks. The army requirements tending towards standardization of all parts, have cut down gasoline consumption and arrested oil wastage. They have also developed accessibility to a greater extent than the demands of the private user.

GREAT BRITAIN TO HOLD COMMERCIAL CAR SHOW

It has been definitely decided to hold a commercial car show in Great Britain in March next. Originally the idea was to hold a mixed show in November, made up of the overflow of private cars, that there was no room for it at Olympia, with a complement of commercial cars added, but strong objections were raised to such a course, and as a result a separate show exclusively for the business vehicle has been projected for the spring.

It was felt in the first place that the Agricultural Hall, in the far from inviting locality of Islington, was not a desirable site for display of industrial automobiles, and that in such a suggestion the commercial car interests would be sacrificed to those of the pleasure vehicle. There is no doubt that the decision to hold a separate show in the spring is a wise one and has the support of the British trade as strongly as the first idea had its opposition.

ECONOMY IN ACCOMMODATION

Our European representative of this paper, while in conversation with the head of the motor department of a large firm employing well over one hundred automobiles, had his attention called to one point that has been a great deal overlooked, namely, the economy in room afforded by the automobile. Like many others in large and populous centers, the firm's premises, including stables, have to be in a very central position where rents, rates, horse food and everything else are at a very high price. With the extension of their business they would have been in a very awkward position, and one involving a big expenditure, had they not realized the possibilities of the commercial car. Having, however, studied the commercial car proposition from the first, they were in a position to know, as the manager told our representative, that while on an average one motor truck does the work of three pair horse wagons, it requires only about one-third of the accommodation of one. Thus the new transport unit is doing three times the work and taking up one-third of the room, working value for working value, only occupies one-ninth of the space required by the older transport method, and as matter of fact, the firm in question has saved very considerable sums on rent owing to this very factor.

It is rumored that the London General Omnibus Company are considering the adoption of electric transmission as standard practice on their vehicles, in combination with the gasoline engine that they will probably manufacture at their Walthamstow works.

There is a good deal of talk in London about a possible amalgamation of the road carriers and expressing businesses, and if all the firms mentioned in connection with the matter give the project their support, the alliance of interests ought to result in a fairly effective combine, involving a very considerable number of commercial automobiles.

Express by Truck Less Than by Express Companies

By a special truck service offered by the Sauers Express, of Springfield, Mass., it is possible to have merchandise of every description transported to adjacent towns within a radius of forty to fifty miles or even greater distances. The rates are even less than for the same shipment by ordinary express, and furthermore, deliveries are made at the end of the line quicker than could be done by local express companies.

If you purchase your trucks in the future, your business will suffer in the present

Anti-Freezing Solutions

Use and Value of Different Chemicals Which Are Dissolved in the Water of the Cooling System to Prevent the Same From Freezing in Winter

IN order to prevent the water in the cooling system of the gasoline motor from freezing in winter, it is necessary to add to it some ingredient which will lower its freezing point. There are a number of substances suitable for this use and each has its advantages and disadvantages. It will be noticed in the following solutions that the greater the percentage of the substance used, the lower the freezing point of the solution is. It is best to make up a solution which has a freezing point about 10 deg. below the lowest temperature likely to be encountered during the winter. The reason for not making the solutions stronger than necessary is that they are not only more expensive, but in the cases of the carbonates and chlorides, the stronger the solution, the greater the corrosive action and in the case of alcohol, the greater the evaporation.

Alcohol

Two kinds of alcohol are used, wood and denatured. The wood alcohol lowers the freezing point more for the quantity used than the denatured, but on the other hand, the denatured does not evaporate so rapidly. Unless extraordinarily low temperatures are liable to be encountered; it is therefore more economical and less trouble to use the denatured alcohol. The accompanying diagram shows the freezing points of the different solutions of alcohol and also their specific gravity. This latter is, however, of small importance from a practical point of view. The freezing points are correct to within 2 deg.

Alcohol solutions must be replenished from time to time to make up for evaporation. This is practically their only disadvantage, as they do not corrode any of the metal or rubber parts of the cooling system and leave no deposit or sediment regardless of the strength of the solution.

In addition to the straight solution of alcohol, solutions of alcohol, glycerine and water and alcohol, potassium carbonate and water are sometimes used. The addition of glycerine to an alcohol solution retards the evaporation of the alcohol to a certain extent.

Glycerine

Glycerine is the least effective and most expensive of the anti-freezing agents. More of it must be added to the water to reduce the freezing point to the desired degree than any of the other agents. On the other hand it does not evaporate and has no chemical action on the metal parts of the cooling system. It does attack rubber and this agent

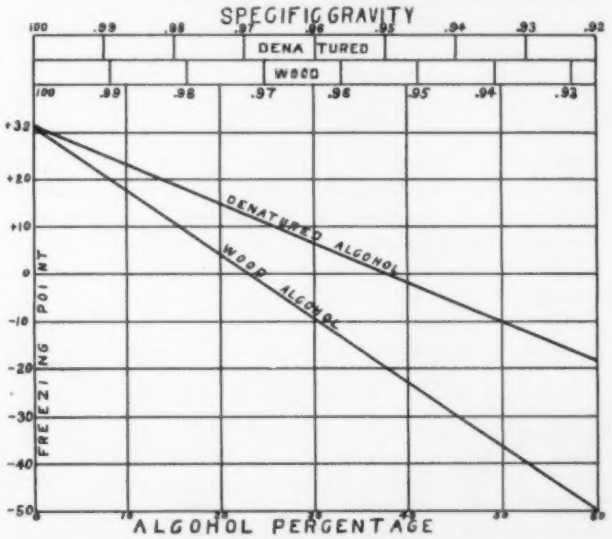


Table of Specific Gravity and Freezing Points of Alcohol Solutions of Various Proportions in Water

should not be used where rubber hose is a part of the system. It does not crystallize and leaves no sediment or incrustation.

Calcium Chloride

This substance is a solid and is dissolved in the water in the proportion of about 2 lbs. to the gallon to produce a freezing point of 10 deg. The accompanying table shows the

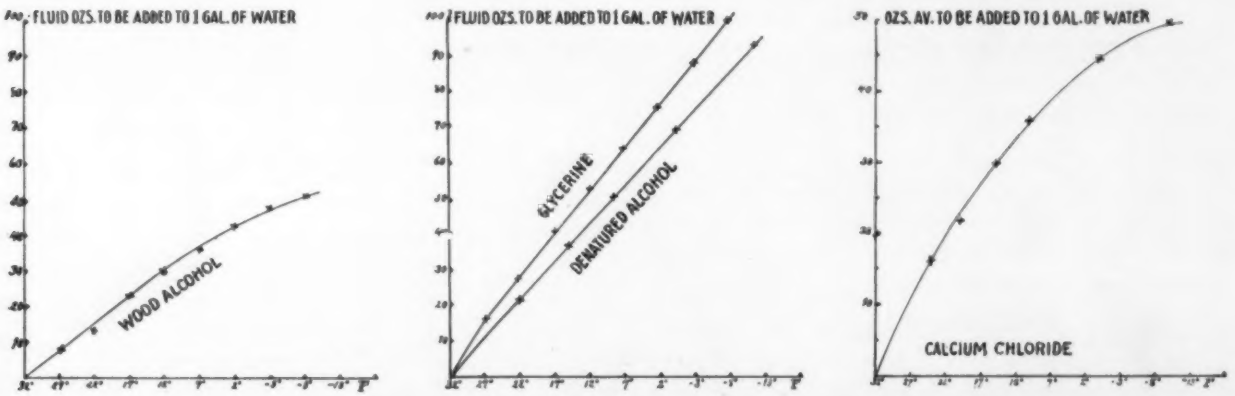

FLUID OZS. TO BE ADDED TO 1 GAL. OF WATER
WOOD ALCOHOL
FLUID OZS. TO BE ADDED TO 1 GAL. OF WATER
GLYCERINE
DENATURED ALCOHOL
OZS. AV. TO BE ADDED TO 1 GAL. OF WATER
CALCIUM CHLORIDE

Table of Freezing Points of Different Solutions of Different Strengths, Calculated by David Wilbur Horn, Ph.D., Consulting Chemist

different proportions. This solution of course does not evaporate any faster than the water. It is liable to deposit sediment or incrustation, especially when the solution is very strong and will produce electrolytic action between dissimilar metals such as iron and brass, or iron and copper, when they are connected by metal. If the radiator is brass or copper and the water jackets iron and the two are connected by rubber hose no electrolytic action will take place, but in the case of brass glands or manifolds bolted to iron cylinders, the action will take place. This solution should never be used with applied water jackets of brass, copper or aluminum. It is very destructive to aluminum even in the absence of other metals touching.

Magnesium Chloride

This substance is seldom used alone, but in conjunction with other chlorides or carbonates. Its advantages and disadvantages are practically the same as those of calcium chloride.

Sodium Carbonate

A solution of glycerine 25 parts, water 70 parts and sodium carbonate 2 parts, all by weight, is said to be effective down to about 10 deg. The proportion of solid matter in solution is so small that there is not likely to be any deposit and very little electrolytic action.

Sodium Chloride

Sodium chloride or salt is effective down to 0 deg. if the solution is saturated. In order to make a saturated solution, the water must be made to dissolve all the salt it will take up. The electrolytic action from this solution is very rapid and as the water evaporates the salt will be precipitated in crystals, which are liable to get into pockets of the water jackets or radiator and lower the efficiency of the cooling system. This solution is probably the cheapest to make, but its effects on the motor and radiator are very bad.

Potassium Carbonate

A solution containing water 100 parts, potassium carbonate 75 parts and glycerine 50 parts, all by weight, has its freezing point at 20 deg. It is liable to form deposits and sediment and also produce electrolytic action.

Oils

Light oils are occasionally used instead of water in the cooling system in cold weather. Such oils should be very light and thin and before putting the oil in the system, all water should be taken out, as it is obvious that oil and water will not mix. Oil should only be used where the radiator and circulating pump are very effective, as the oil is slow to run and takes on and gets rid of heat slowly. It will attack rubber hose and gaskets and should not be used in connection with them or with thermo-syphon systems.

DOG-CATCHERS' MOTOR WAGON

The latest addition to the Detroit fleet of municipal power wagons is the GMC dog catcher's wagon, shown above. The vehicle is operated under the direction of the Detroit Police Department and is impounding on the average of ninety muzzleless canines per day. The new wagon is designed to carry the dogs in the most humane manner possible.

Motor-Driven Dog-Catchers' Wagon in Detroit

Fourteen cages of various sizes are provided and whenever it is necessary, a vicious dog may be kept from the others in a separate compartment. Each cage is removable and is equipped with a water pan especially designed for the purpose.

Tractor With Fifteen-Ton Trailer

A fifteen ton capacity ash wagon was recently seen on the streets of New York City, drawn by a Martin tractor, one of the products of the Knox Automobile Company. The wagon is twelve feet in height and twenty-six feet in length. The wagon was built for the Borough Development Company, of Brooklyn, to take fifteen tons of ashes at a load and to stand a speed of 8 m.p.h. It is shod all around with steel tires. The front wheels, however, will be shod with rubber tires for winter wear. The heavy load, however, is at all times carried on steel tires.

THE SIMMONS HARDWARE COMPANY, of St. Louis, Mo., well-known manufacturers of "Keen Kutter" hardware, have been using motor trucks for the past five years, and find them very much more satisfactory than horses, particularly from the standpoint of service. In connection with the latter item the company states that with the trucks it can serve the retail trade in its home town in a manner which would be impossible without them, and at much less cost.

Forget the impractical commercial cars of a few years ago and see what can now serve you

Investigation of Efficiency of Worm Gearing For Automobile Transmission*

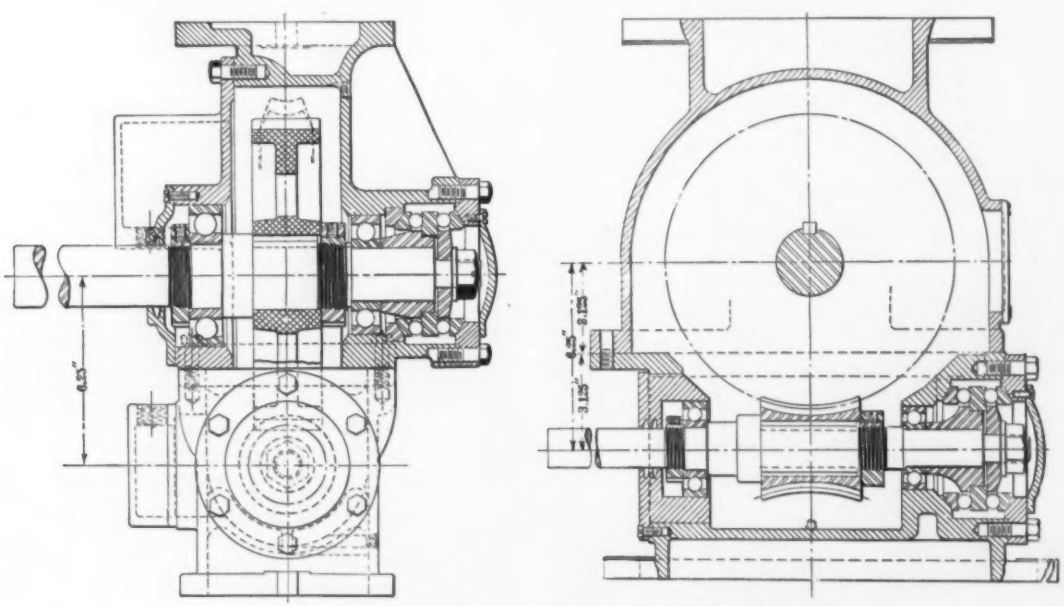
BY WILLIAM H. KENERSON, PROVIDENCE, R. I.
Member of the American Society of Mechanical Engineers of New York City

THIS investigation was made at the plant of the Brown & Sharpe Manufacturing Company for the purpose of determining the efficiency of three types of worm gearing for use in an automobile transmission system and the heating effect due to continuous running. The power for these tests was obtained from a 50 h. p. induction motor, running approximately 870 r. p. m. at full load.

Between the motor and the worm gear case was placed an automobile transmission gear case to enable tests to be made at two lower speeds. Between this and the worm gear case was placed a transmission dynamometer designed by the author and described in a paper presented before this Society and published in Vol. 31 of Transactions. An Alden brake was used to absorb and measure the power transmitted by the gears under test.

A thermometer placed in the oil well at the back of the worm gear case indicated the temperature of the oil, and another thermometer placed on the wall near the apparatus indicated the room temperature.

The oil employed to lubricate the gears was one intended for use with superheated steam, having a specific gravity of 26 Baume, flash point 625 Fahr., and viscosity at 212 deg. 260 to 265. The case contained about 5 quarts of the oil.



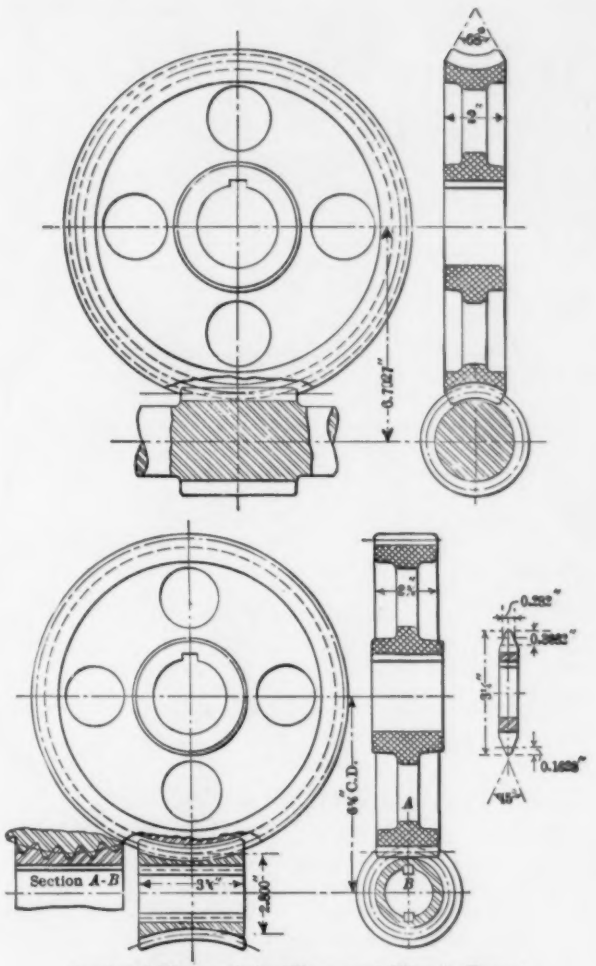
Sectional Views of the Gear Cases Employed in Making the Tests

In all the trials the worm was located underneath the gear, as illustrated by the sectional drawings. As indicated, both shafts are mounted on ball bearings and end thrust ball bearings take care of the thrust on the worm and wormwheel. All the worms were made of machinery steel, case-hardened, and the wormwheels of phosphor bronze.

*From paper read by William H. Kenerson before the American Society of Mechanical Engineers of New York City.

TABLE 1 EFFICIENCY TEST OF NO. 2 WORM GEARS WHEN ON DIRECT SPEED

R.P.M. Motor	R.P.M. Worm	R.P.M. Worm Gear	Speed of Worm in Ft. per Min.	Initial Load	Reading on Scale	Load on Brake 315 Ft. Radius	H.P. per 100 R.P.M. Brake	Total Brake H.P.	Total Trans. Dyn. H.P.	Efficiency of Worm Gears	Transmission Dyn. Reading				Temp. at End of Test		Time		Duration
											1	2	3	Av.	Oil	Room	Start	Fin.	
875	875	196.9	690.7	104	55	49	24.5	48.24	49.26	97.9	5.6	5.65	5.65	5.63	268	65	10:14	10:20	6
873	873	196.4	689.1	104	60	44	22.0	43.22	44.35	97.5	5.1	5.05	5.1	5.08	273	65	10:20	10:25	5
880	880	198.0	694.6	104	65	39	19.5	38.61	40.92	94.4	4.7	4.65	4.6	4.65	276	66	10:25	10:30	5
880	880	198.0	694.6	104	70	34	17.0	33.66	36.26	92.8	4.15	4.1	4.1	4.12	275	66	10:30	10:33	3
883	883	198.7	697.0	104	75	29	14.5	28.81	31.17	92.4	3.55	3.55	3.5	3.53	273	66	10:33	10:37	4



Sectional Views of the Worm and Wheels Tested. The Shape of the Cutter is Also Shown

The first worm and wheel tested are shown in cut and are similar to those used for driving the spindle on the Brown & Sharpe automatic spur gear machines. This pair of gears is an unusual case of the worm and wormwheel. The smaller gear is hobbed with a hob of the size of the larger gear, thus making possible adjustment of the larger gear, which would not otherwise be the case. While in appearance this gear resembles a Hindley worm, it is not such in reality.

The First Worm and Wheel Tested

Although not strictly in accordance with usage, the smaller gear will be called the worm and the larger the wormwheel in the following description. Illustrations give the dimensions and a good general idea of this pair. The wormwheel was cut with the cutter shown, and the shape of the teeth on a section through the worm and wormwheel, parallel to the axis of the worm, is also shown.

TABLE 2 WORMS AND WHEELS AND BEVEL GEARS. AVERAGE EFFICIENCIES TAKEN

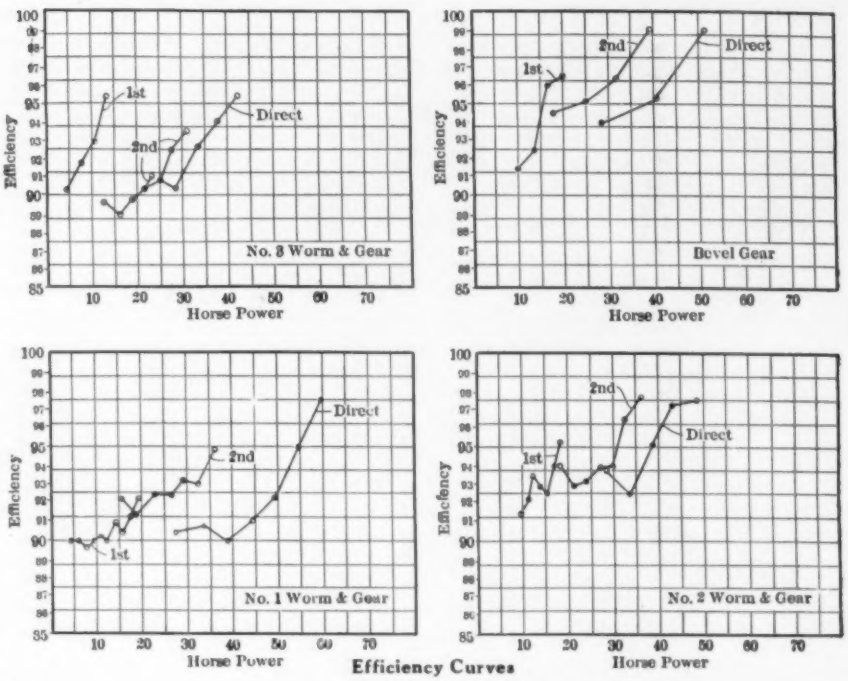
	Gear No. 1							Gear No. 2							Gear No. 3							Bevel Gears						
	R.P.M.		H.P.		Temp.		Eff.	R.P.M.		H.P.		Temp.		Eff.	R.P.M.		H.P.		Temp.		Eff.	R.P.M.		H.P.		Temp.		Eff.
	Worm	Worm Wheel	Input	Output	Oil	Room		Worm	Worm Wheel	Input	Output	Oil	Room		Worm	Worm Wheel	Input	Output	Oil	Room		Pinion	Gear	Input	Output	Oil	Room	
First Speed	254.2	65.03	26.18	24.06	206	73	91.9	254.7	57.32	19.26	18.34	164	69	95.3	254.1	57.19	18.75	18.30	136	79	95.5	254.2	68.43	20.92	20.19		70	96.6
	254.6	65.13	24.75	22.47	217	73	90.8	254.7	57.32	17.99	16.91	169	69	94.1	254.8	57.33	16.54	15.48	144	79	93.1	254.5	68.51	17.50	16.78		70	95.9
	254.5	65.11	22.98	20.81	225	73	90.5	254.5	57.25	16.73	15.46	162	68	92.5	255.0	57.38	13.75	12.62	149	79	91.8	256.1	68.95	14.54	13.44		69	92.4
	255.1	65.25	21.17	19.25	228	73	90.9	254.3	57.22	15.08	14.02	142	69	93.1	255.4	57.47	10.80	9.77	150	79	90.5	256.5	69.05	10.95	10.01		70	91.4
	255.3	65.30	19.56	17.63	232	73	90.1	255.1	57.39	13.52	12.63	159	69	93.5	255.6	57.52	7.38	6.90	149	79	93.6							
	255.7	65.41	17.76	16.02	233	74	90.2	254.9	57.35	12.14	11.18	160	69	92.2														
	255.9	65.48	16.00	14.41	233	74	90.1	254 8	57.34	10.69	9.75	160	69	91.4														
	256.3	65.60	14.34	12.79	233	74	89.4																					
	256.5	65.62	12.37	11.15	231	74	90.2																					
	256.8	65.69	10.55	9.53	229	74	90.2																					
Second Speed	545.2	139.5	43.48	41.16	178	73	94.8	544.2	122.4	36.95	36 11	178	70	97 7	543.2	122.2	38.59	36.06	204	77	93.4	541.8	145.0	39.64	39.37		67	99.3
	546.9	139.9	40.54	37.78	207	70	93.0	545.0	122.6	34.61	33.10	184	70	95.6	543.8	122.4	35.36	33.04	215	77	92.4	544.1	146.4	33.43	32.22		67	96.4
	547.8	140.1	36.88	34.33	214	70	93.2	546.7	123.0	32.09	30.14	188	70	93.9	544.8	122.6	33.12	30.03	219	77	90.7	545.7	146.9	26.25	24.98		67	95.2
	548.8	140.4	33.47	30.89	217	70	92.3	548.4	123.4	28.90	27.15	187	70	93.9	545.8	122.8	29.82	27.02	221	77	90.6	548.5	147.6	18.75	17.72		67	94.5
	550.2	140.7	29.76	27.44	218	70	92.3	549.0	123.5	25.80	24.08	186	71	93.3	546.5	123.0	26.70	23.98	222	78	89.8							
	550.5	140.8	26.01	25.94	218	71	91.3	549.6	123.7	22.59	21.03	163	70	93.1	547.2	123.2	23.56	20.95	222	78	88.9							
	551.1	141.0	22.22	20.45	217	71	92.0	551.0	124.0	19.12	17.98	163	70	94.0	548.3	123.4	20.02	17.89	221	78	89.4							
Direct	859.5	219.8	66.43	64.86	178	69	97.6	873.5	196.5	49.35	48.14	265	66	97.5	866.0	194.8	49.95	47.72	215	77	95.5	872.0	234.7	52.05	51.63		70	99.2
	864.5	221.1	62.89	59.71	201	70	94.9	875.0	196.9	44.50	43.30	256	65	97.3	868.2	195.3	45.68	42.98	223	77	94.1	878.6	236.6	42.09	40.22		70	95.5
	871.0	222.8	59.23	54.60	214	70	92.2	878.0	197.5	40.40	38.50	260	66	95.2	870.8	195.9	41.20	38.20	228	77	92.7	884.4	238.2	30.40	28.58	132	79	94.0
	874.5	223.7	54.22	49.22	224	70	90.8	881.0	198.2	36.40	33.70	261	66	92.4	874.0	196.7	36.88	33.45	230	77	90.6							
	878.0	224.6	48.60	43.80	230	70	90.1	883.4	198.8	30.73	28.84	262	66	93.8	876.0	197.1	31.45	28.60	230	78	90.9							
	882.0	225.6	42.25	38.36	233	70	90.8								878.8	197.7	26.45	23.73	229	78	89 7							
	884.0	226.1	36.24	32.79	237	71	90.5																					

All necessary information pertaining to pair Nos. 2 and 3 is given in cut. The difference between gears 2 and 3 is principally one of shape of the worm threads. This difference is clearly brought out in the sections of the worm and wheel shown.

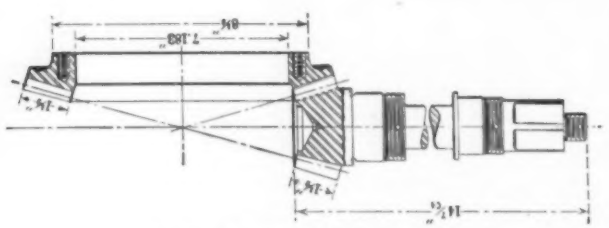
In conducting the trials the load was maintained at the desired point by one observer who adjusted the brake. Readings were then taken on the transmission instrument by two independent observers. The speed of the motor was observed in each case and from this, knowing the gear ratio, all the other speeds were easily computed. Temperatures were taken immediately following each series of observations.

For purposes of comparison a series of trials was run on a pair of bevel gears, the principal dimensions of which are shown.

The curves of line drawing show in graphic form the average efficiency of the different gears at the various loads and speeds.



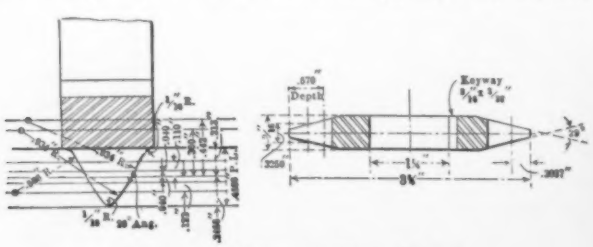
Efficiency Curves



Section of Driving Gear and Pinion

In conjunction with the efficiency trials a series of runs was made to determine the heating effect due to continuous running. In these trials, which were in effect endurance tests, a constant load was transmitted through the gearing and the temperature of the oil in the gear case and the temperature of the room noted at frequent intervals.

From these observations it was found that at the beginning of the run the oil temperature rose rapidly and somewhat irregularly. As the run continued, however, the rise



Section of Worm and Worm Wheel

became much more gradual and regular. In the runs where the smaller amounts of power were transmitted a point was reached where the temperature remained constant.

The higher loads indicated were abnormal for the gears under consideration and would not occur in any use to which the gears would normally be put. The fact that these trials continued for from 60 to 80 minutes without failure indicates that the structure is both strong and enduring and that should such temperatures be reached for any accidental reason the gears would not be destroyed.

WONDERS WHY HE WAITED

It required a long time for Fred. L. Kunkel, president of the Cream City Bedding Company, of Milwaukee, to come to commercial cars, and now that he has done it he wonders why he did not do so before. A two-ton Kissel car is used in the firm's delivery service about Milwaukee as well as for hauling freight. President Kunkel says the car makes about fifty miles a day, and the present cost of operation is much cheaper than horses. It easily does the work of two double horse teams. The two men on the car are paid $4 a day; gasoline is 60 cents, and all items considered, $8 a day will cover everything. The driver was a former teamster. Asked how he came to buy the car, President Kunkel said because of the high cost of feed. He is very enthusiastic about the truck which was purchased last April.

Kissel Car in the Service of Cream City Bedding Company

AUTOMOBILE SHOW DATES AT WHICH COMMERCIAL CARS WILL BE EXHIBITED

November 16-23—Atlanta, Ga. Atlanta Automobile and Accessory Association.
December 3-7—Victoria, B. C. Motor Car and Accessory Dealers.
January 4-11—Montreal, Can.
January 6-11—Cleveland, Ohio.
January 20-25—New York City. Grand Central Palace and Madison Square Garden.
January 20-25—Philadelphia, Pa.
January 23-Feb. 1—St. John, N. B.—Local Armory.
January 27-Feb. 1—Detroit, Mich.
January 27-Feb. 1—Scranton, Pa.
February 8-15—Hartford, Conn. Hartford Automobile Dealers' Association.
February 10-15—Chicago, Ill.
February 10-15—Minneapolis, Minn.
February 10-15—Ottawa, Can.
February 15-22—Newark, N. J. New Jersey Exhibition Company. First Regiment Armory.
February 24-27—Kansas City, Mo.
February 24-March 1—Omaha, Neb.
February 24-March 1—St. Louis, Mo.
February 24-March 1—Cincinnati, Ohio. Automobile Dealers' Association.
March 3-8—Pittsburgh, Pa.
March 17-22—Buffalo, N. Y.
March 19-26—Boston, Mass. Mechanics' Building.
March 24-29—Indianapolis, Ind.

W. J. Healey, Spokane, Wash., has secured the agency for Federal trucks.

Lauth-Juergens Company, of Fremont, O., is preparing to enter Los Angeles field.

Paxton Taxicab Company, Omaha, Neb., has been purchased by the Omaha Taxi Company.

Meyer-Busch Company, 5072 Delmar Avenue, St. Louis, Mo., has the agency for the Brown commercial car.

American Locomotive Company has established a motor truck service station 315 x 98 ft. in Long Island City, N. Y.

Rockwell Motor Transportation Company, New York City, has taken the agency for the Lincoln, a 1000-lb. delivery wagon.

Brown & Altick, 115 E. High Street, Springfield, O., agents for Chase trucks, have inaugurated a motor delivery service.

American Motor Truck and Auto Company, Melbourne, Australia, has taken the agency for Federal trucks in Melbourne.

Metcalf Auto Company has been organized at Farmington, Me., with a capital of $10,000 for the purpose of dealing in motor cars and trucks.

Albert Engelhardt has resigned from the Universal Truck Company, N. Y. City, and secured the metropolitan agency for Stegeman trucks.

Kansas City Motor Car Dealers' Association have decided to run their show, which opens on February 17th, 1913, in Convention Hall, for a period of 11 days. The first week will be devoted to the exhibition of pleasure cars, and the last four days to the exhibition of commercial motor cars.

Borg & Wherry, St. Paul distributors of the Abbott-Detroit, Mitchell and Hupmobile lines, have added the Stewart truck and established a truck service.

Standard Automobile Company, 4722 Delmar Boulevard, St. Louis, Mo., has taken the agency for the Commerce truck. E. C. Bartholomew, manager.

Motz Tire & Rubber Company, Akron, O., has opened a Boston branch at 4 Dundee Street, to take care of its rapidly increasing business in the New England territory.

H. E. Riker & Company, Cleveland, O., have been appointed state distributors for Ohio, for the Stewart Motor Corporation, of Buffalo, N. Y., manufacturer of light delivery trucks.

Federal Motor Truck Company, Detroit, Mich., has closed a deal with Central Automobile Garage & Supply Company, Toronto, Canada, to handle Federal trucks throughout Ontario.

Robinson-Loomis Motor Truck Company, Minneapolis, Minn. F. L. Loomis has disposed of his interests and is contemplating taking on a line of pleasure cars and trucks. T. F. Robinson continues manufacturing the Gopher truck.

The Guarantee Motors Company, of Des Moines, Ia., who are agents for the Chase commercial cars and Abbott-Detroit cars, has built a large modern building at 408-12 W. 12th Street. F. J. Reynolds, of Chicago, has become sales manager for the Chase Commercial Car Department.

Kissel Motor Car Company has established a new service station at 1030 Commonwealth Avenue, Boston, Mass. The building is 74 x 200 ft., two stories high. An extremely large elevator has been installed with a length of 28 ft., and a width of 10 ft., so as to be able to handle the largest trucks.

Milwaukee Automobile Dealers' Association has elected the following officers for the next year: I. G. Hickman, president; Emil Estberg, vice president; Geo. P. Hewitt, treasurer; A. E. Raulauf, secretary; additional director, Alton J. March.

J. W. Leavitt & Company, Pacific Coast distributors of the Kissel Kar trucks and Overland light delivery cars, have increased their business so rapidly that they have opened a separate store for the sale of commercial motor cars, adjoining their main store, where their pleasure cars are on exhibition.

The White Company, of Cleveland, O., has purchased more than an acre of land located at 1024-1028 Commonwealth Avenue, Boston, Mass., on which will be built a large and commodious service station. This building was mainly made necessary by the rapidly increasing volume of business in White trucks.

Reliance Automobile Company, 342 Van Ness Avenue, San Francisco, Cal., has secured new headquarters at 1655 Van Ness Avenue, and will move into them as soon as alterations are finished. The salesroom for Knox trucks and the service department of the Reliance Auto Company will remain on Fulton Street.

Obtaining Prospects

BY E. S. FOLJAMBE

This is the fourth of a series of eight articles by Mr. E. S. Foljambe, dealing with subjects of interest to agents, dealers and manufacturers. Briefly, the subjects taken up are: Taking On a Commercial Car Agency; The Kind and Location of Salesroom; The Selection of and Instructions to Salesmen; Obtaining Prospects; Carrying the Campaign Into the Prospect's Territory; How the Engineering Force Can Assist the Retail Sales Department; The Agent's Responsibility After the Sale, and Relations Between the Agent and the Manufacturer. We are sure these will prove instructive and interesting reading.—EDITOR.

PART IV.

OBTAINING prospects in the experience of some of the unsophisticated dealers has been very much like discovering diamond mines. With others, prospects are all they ever can get, so that the life of the agency can be judged by the size of the bank book of the agent, or by the size of "papa's pocketbook," which is often the last resource. The methods usually employed in obtaining prospects are dependent somewhat upon the age of the agency. If an established house or branch, by far the largest number of prospects are obtained through the medium of present owners. If the agency is a new one and has no clientele, the first work is that of building up a list upon which the salesman can work. Aside from names obtained from satisfied users, there are three methods most commonly practiced, namely, local advertising, visitors' registers both at the office and at the Shows, and lists of business houses in the various lines which can use trucks of the capacity handled by the agent. To this must be added the names obtained from salesmen or acquaintances in the tire or accessory lines; the tire man as a rule being particularly well posted on the question of intending purchasers.

Advertising Is the Art of Creating Interest

It is the first step in salesmanship. Advertising does not detract from the salesman. It is the pioneer who goes before and prepares the soil for the work of the salesman. It cultivates the field and makes it fertile and ready to receive the seed of argument and ultimate conviction, the planting and maturing of which is the work of the salesman.

Let us take these various methods up separately in their relative importance.

Obtaining Prospects From Users

Under this heading doubtless the largest number of names which eventually become purchasers may be placed. Business men who are using trucks have many acquaintances among other business men with whom they trade or have business relations. It is but natural that Mr. Brown should tell Mr. Smith, who already has trucks, that he thinks he will put on some machines in his work. Now, if Mr. Smith is a satisfied user of a certain make of truck, it is again but natural that he shall drop this hint to the agent with whom he deals, or with the salesman or service department man, who, when on his rounds, calls upon him. In this way the most valuable and live list of prospects can be obtained. This means that the live agent must get out, and cannot sit quietly in his office and sell trucks. He and his aids must be in touch with those who are already using the trucks, meet and converse with them often enough so that there is an opportunity for them to learn of the intention of others to purchase. One business man who is intending to buy trucks is more likely to ask the opinion of another man who is already a user of trucks, than he is to go to an outside source for information. He wants to know what the other fellow has found out, and whether he has found that trucks pay. Thus the intention of one man to purchase is likely soon to be known among several truck users, even before any agent is aware of the fact.

On the Street

On the street, meeting the tire and accessory man the agent or his assistants are often informed of people who intend to purchase. At the clubs, business men's lunches, and other places frequented by merchants or manufacturers of the city, much valuable information may be gathered in regard to new prospects. Friends occasionally give valuable assistance, having learned of prospects through sons or daughters, or even through the younger children who have overheard conversations.

Many valuable names are each year obtained at the automobile shows by suitable registration booths, or other means of obtaining the names and addresses of visitors. The same is often true in the agent's office, especially if receptions or entertaining is done in connection with truck demonstration or parades. There is a growing custom of parking the cars for inspection at the end of motor truck parades or tests, and registration of names at these places often proves valuable.

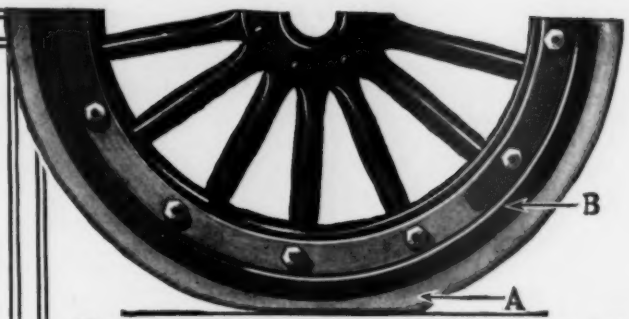
Advertising

Advertising in a local way causes a few enquiries or visits, and again names can be obtained, but by far the largest bulk of prospects in the experience of nearly every dealer is found to come through satisfied users. This is true to such an extent that many local agents depend almost entirely upon it, and carry on their local advertising more with the idea of educating the general public and keeping the name of the car before the public, than with any hope of immediate returns in the way of sales.

Advertising can be carried on in such a large variety of ways that it is impossible to cover them all in any article, but briefly, the chief methods can be mentioned. The question of size of appropriation, naturally has much to do with the methods employed. Advertising must be consistent, each attempt should have a definite object in view. Haphazard hit-or-miss advertising is usually money thrown away; in fact, a large

STUDY the illustrations! They show how you can double the efficiency and profit of your heavy service truck.

The upper cut shows the "traction" wave always formed in the ordinary continuous tire under heavy load. This wave, caused by the bulging of the rubber, works into the base and tears the tire from its fastenings. It can't be avoided in any ordinary way. Then, too, this wave forms a constant hill—the tire is always climbing, retarding progress, reducing power efficiency.



Showing traction wave in ordinary continuous tire, (A) indicates where wave forms. (B) indicates base where roll and tread separation occur.

Contrast this condition with the profit-making worth of—

Firestone

Continuous Base —Notched Tread Truck Tires

The lower cut shows how the Firestone Notched Tread overcomes the wave, by preventing its formation. This is *not* an individual block tire, with tread-tearing, metal-retaining plates. The Firestone continuous base is of the same tough, resilient compound as the tread. These tires hold the road, increase traction, absorb all vibration.

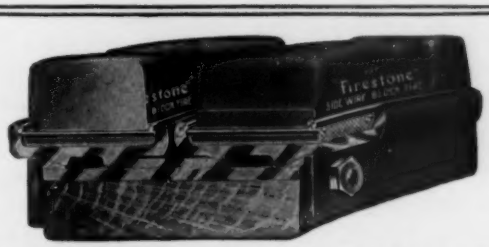
Get the full facts. They mean Economy and Increased Profits.

Firestone Truck Tires for Every Type of Car, Every Load, Every Road Condition

The Firestone Line of Truck Tires has in it the tire, solid or pneumatic, you need for your particular service. Get the books which tell the story. Ask, as well, for Quick Removable Rim facts. They are valuable.

The Firestone Tire & Rubber Co.
"America's Largest Exclusive Tire and Rim Makers"
Akron, Ohio—Service Stations Everywhere

Showing how Firestone Notched Tires overcome destructive traction wave. (A) indicates wave passing off into space between blocks. (B) indicates continuous base—assuring absorption of vibration in every direction.



Cross section view of Firestone Continuous Base Notched Tread Tire—dual tread.

Cross section view of Firestone Notched Tread Tire —single tread.

percentage of the money which is supposed to be spent in advertising is virtually wasted. Features of the truck, improvements and changes, new models, etc., are often made the basis of excellent advertising copy by trained men connected with the manufacturing organization. This is particularly true of the manufacturers' copy in trade papers, which are always looked to by the prospective purchaser on new models. The dealer should therefore encourage trade paper advertising on the part of the factory. The dealer should also avail himself of the suggestions in the makers' advertisements, but should be careful not to use copy pertaining to events of no special interest to his particular locality. The probabilities are that the agency has no special or trained advertising man on its staff, in which case help from a trained and competent source should be very acceptable.

Advertising is the Art of Creating Interest

It is the first step in salesmanship. If it does not create interest in the mind of one who may become a prospective customer, it has failed of its true purpose. If the interest is not sufficient to cause the prospect to write or call, it has again failed in producing the object desired, but not always completely failed, for it may have produced a slight interest which, if augmented by successive ads, may be so stimulated that the prospect will eventually make known his active interest. It is a mistake to try and cover too many points in any one advertisement. Choose a pertinent fact, and then drive it home so that by no chance will the reader miss the point intended. He can carry away this one point, and will then be ready to assimilate further suggestions. Stick to the truth. This seems to be difficult for the man with the advertising instinct. Too broad statements, bald assertions which will not bear the light of investigation, do very much more harm than good. It is much better to keep well within the legitimate facts than to make assertions which may fool a few, but which eventually give the house or agency a bad reputation.

Advertising Does Not Detract From the Salesman

Advertising is the advance man, who informs the public It is the pioneer who goes before and prepares the soil for the work of the salesman who is to follow. It does not detract from the salesman, but lifts from him much of the burden of getting in touch with his prospect. Aside from the general education of the public which advertising provides, it should bring definite results to the office. In other words, advertising introduces the prospect to the salesman. It cultivates the field and makes it fertile and ready to receive the seed of suggestion and ultimate conviction, the planting and maturing of which is the work of the salesman.

The foregoing simply gives an idea of the methods used to obtain prospects; in other words, the actual business of selling has but begun. If these names are carried around in the pocket in a worn notebook and eventually lost, sales naturally do not follow. A well planned and efficient "follow-up system" must be used, or much of the advantage gained by the previous work will be lost. The follow-up system is just as important as obtaining the name, and each prospect's name should immediately be placed in the follow-up system as the first step in the process which is to culminate in a sale.

Follow-Up Systems

There are innumerable minor deviations from the general plan, or simple follow-up system, therefore the most generally used system will be dealt with. This consists usually of a card file, upon which the name, address, business connection, source from which the prospect's name was obtained, kind of service in which the truck will be used, kind of loads carried, number of stops, and other items, are recorded. This is for reference in the office, and the cards are never removed except by a stenographer to check them up. On this card is also kept a complete record of the days the prospect is called upon, and by whom, and any other information, such as the date of letters written to the prospect, telephone calls, etc. This is spoken of as the "prospect card." Samples of such cards as used by Philadelphia Branches are herewith reproduced.

As a rule the territory is divided into districts, each designated by a number or letter, which division is so made that each section, as near as possible, has equally good territory for the salesman; in other words, the entire business district is not given to one man, but is arranged in large cities so that three or more of the salesmen will have territory including part of this section. Then there are outside districts which may be given to salesmen who are in training, as it were. According to the districts in which the prospect's business is located, the names are given to this or that salesman, who immediately plans his campaign to bring about the purchase. The system which follows is typical of "follow-up" and is that in use by the International Motor Company. After visiting the prospect, the salesman turns in a report, which is then recorded on a larger card, which may be designated "the record." On this the results of the interviews are noted, and the date for the next call recorded, and the card is then by means of a tickler system arranged so that it will come up again at the proper time. When a name is given the salesman and placed on the record card, the card is then tabbed for several days ahead, so that it will turn up again in that time, thus giving the salesman a few days in which to make his call and report. If, at the expiration of that date when the card turns up again, he has not made his report, he is notified and required to give a reason, and in this way a salesman is kept up to date in his work, and a careless or procrastinating man is soon noted. The clerk in charge of the system reminds the salesman a day in advance, of the work for the morrow. The record card gives briefly the history of the various postponements, and reasons for same. If the prospect purchases trucks of another make, these facts are recorded, and if possible the reasons why the sale was not made by the salesman. In most agencies a monthly record is kept of the work of the salesmen. Part of this record is taken from the record cards. The monthly report shows in detail what has been done by each individual salesman; for example, it should give the number of prospects turned over to the salesman, the number of interviews, the number of sales, or if no sale, the reason for same. In the best regulated agencies the reasons for a non-sale are carefully investigated and recorded, as this forms a guide for the future. In the system above mentioned the reasons for non-sales are classed under the following heads:

Price or Terms
Specifications
Delay
Quality of Product
Order Not Properly Solicited
Prospect Not Properly Followed Up
Design of Truck or Bodies
Deferred Purchase
Dissatisfaction on Account of Previous Dealings

Other items such as special conditions in which the truck might not show to advantage, or propositions to trade-in used cars, or exchange for goods, etc., in which there would not be sufficient profit, may be added.

After the Sale

After the sale, the prospect's name, he having become an owner, is usually transferred to another card file, where the cards are of a different color. On this are recorded the number and capacity of the vehicles purchased, date of purchase, equipment, and memorandum of any special features in connection with the sale. Salesmen are required to follow-up the owners at more or less regular intervals, either by visits, by sending clippings of items connected with the trucks as used in similar lines of service, matters pertaining to the improvement or standing of the company which manufactures the truck, colored post cards of trucks recently put in service, and information on new models, or special bodies which might be of service in their particular line. During the salesman's visit he ascertains how the vehicle is performing, what are the grievances, if any, of the users, and upon his return these things are reported, and if necessary a service department man is immediately dispatched to look after the difficulty. By thus continually keeping in touch with the purchaser, many little things which might lead to dissatisfaction, and the eventual purchase of a truck of another make, are known and remedied. Conditions in the owner's business which might imply the need of more trucks are noted, and the salesman starts on a campaign for a re-order.

In the best regulated agencies a very complete record of the work performed by the trucks after their sales, is kept in a suitably ruled ledger. This shows the type of chassis, type of body, and kind of accessories and equipment; reports of changes are recorded, reports of accidents and damage done, etc., are noted. This forms a valuable record, and will be found helpful to not only the salesmen, service department, and all members of the branch, but is even of use to the manufacturer.

The Perfect Sale

It is well to establish what constitutes a perfect sale, and stimulate the salesman by a reward at the end of the year for his work; for example, one well-known company considers the condition of a perfect sale as follows:

List price for cash

At least 10 per cent. deposit

Standard specifications

No date of delivery

The salesmen are credited with a certain number of points for each sale, one hundred points being given if the sale is a perfect one, and less according to the amount of variation from the perfect sale conditions. The salesmen are then rewarded at the end of the year, the highest receiving ten per cent. bonus on his total earnings for the year, the next highest a bonus of six per cent., and the third four per cent. This arrangement has been found to encourage the salesmen, and to result in more perfect sales as outlined by the agency.

The subject of the salesman's familiarity with the business conditions of his prospect, and carrying the campaign into the prospect's territory will be discussed in the next issue.

(To be continued.)

GMC ELECTRIC TOWER WAGON

The Nashville Railway & Light Company has purchased a G. M. C. electric tower wagon for emergency work and repair of its overhead trolley system. This truck, which is capable of 18 m. p. h., will replace two horse-drawn emergency wagons and will effect a substantial saving in the operation of this department. As the tower wagons are as a rule used in emergencies only, it has been necessary to have an equipment of horses ready for immediate action. The new truck will entirely obviate this, as the electric tower wagon is always ready.

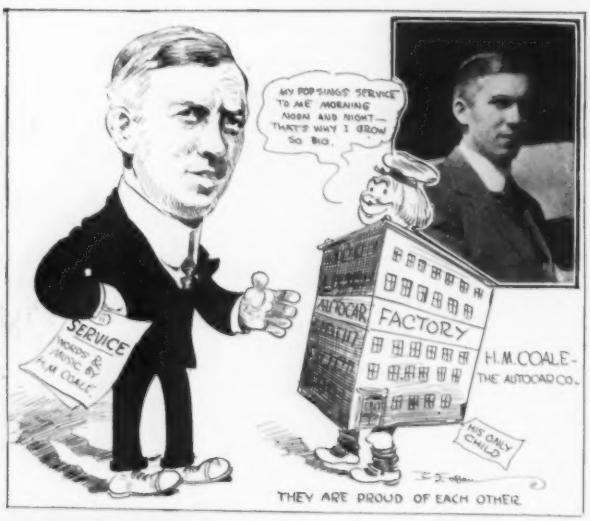
GMC Electric Tower Wagon

Aside from the greater economy and efficiency—is the humane side of the electric truck. Formerly when a trolley wire was broken down or some part of the line needed repairs, a horse-drawn emergency wagon was run out to the point affected. Several long runs in quick succession are sometimes necessary and it will be a point in favor of the electric that the horses will be relieved of this trying work.

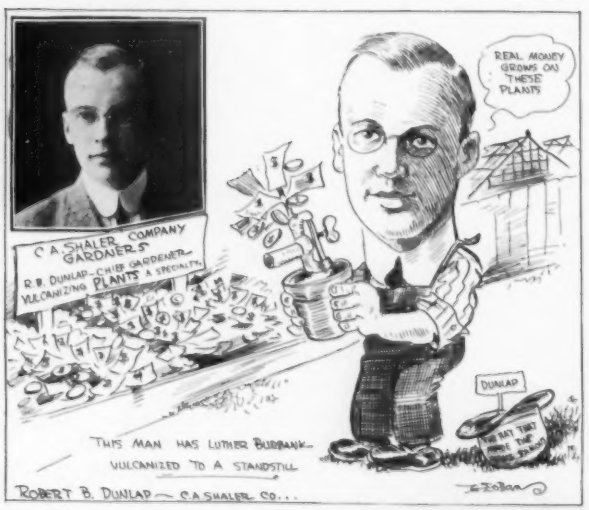
The company expects to replace all of their horse-drawn vehicles with electric power wagons and will install two more electric trucks to the line construction department.

Take time by the forelock—use trucks

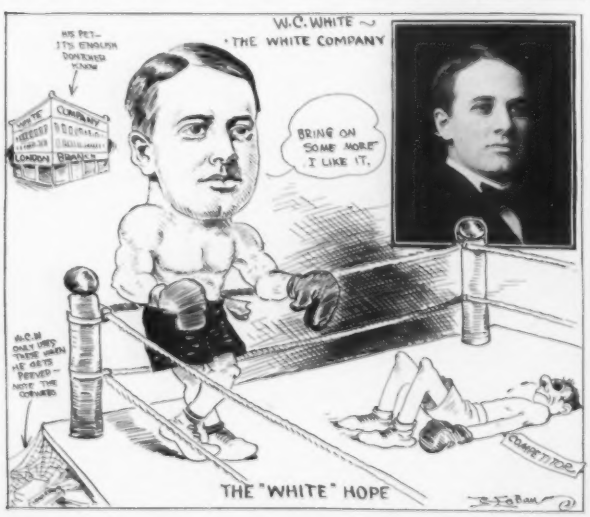
C C J GALLERY of SALES MANAGERS

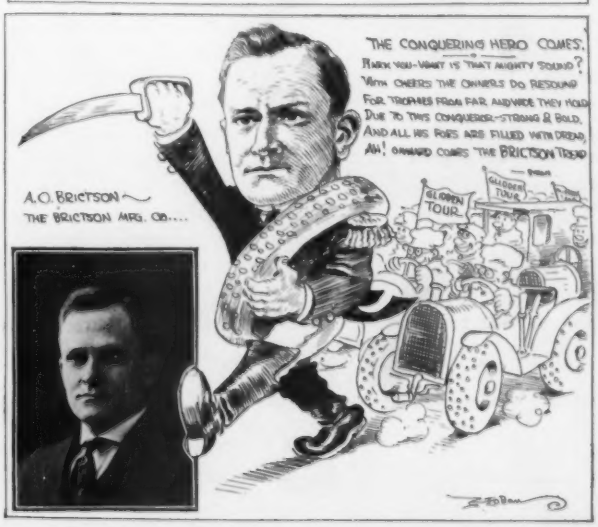

MY PERSONAL SERVICE TO ME MORNING NOON AND NIGHT— THAT'S WHY I GROW SO BIG.
SERVICE
WORDS & MUSIC BY H.M. COALE
AUTOCAR
FACTORY
H.M. COALE— THE AUTOCAR CO.
HIS ONLY CHILD
THEY ARE PROUD OF EACH OTHER

SALES TALKS
ROBERT O. PATTEN— THE PIERCE-ARROW MOTOR CAR CO....
HE'S A GOOD PITCHER, BUT A POOR "CATCHER!"
AND HE WON'T EVEN LOOK OUR WAY.
SOME OF THE DELEGATES FROM A FRIENDS' MATRIMONIAL AGENCY.
THE WORM WILL TURN!
"HOME RUN" PATTEN.


C A SHALER COMPANY GARDENERS
R.B. DUNLAP—CHIEF GARDENER— VULCANIZING PLANTS A SPECIALTY
REAL MONEY GROWS ON THESE PLANTS
DUNLAP
THIS MAN HAS LUTHER BURBANK— VULCANIZED TO A STANDSTILL
ROBERT B. DUNLAP— C A SHALER CO...

GIBNEY TIRES
THIS MIGHTY OAK FROM A LITTLE ACORN GREW.
TIRE PLANT
ONE YEAR
TWO YEARS
THREE YEARS
3 YEARS AHEAD— EVEN FATHER "TIME" CAN'T CATCH HIM—
JAMES L. GIBNEY— SALES MGR. AND PRES. GIBNEY "TIRE" AND RUBBER CO...


W.C. WHITE— THE WHITE COMPANY
HIS PET— IT'S ENGLISH DON'T YER KNOW
WHITE COMPANY
LONDON BRANCH
BRING ON SOME MORE! I LIKE IT.
W.C.W. ONLY HITS THERE WHEN HE GETS PEEVED— NOT THE ORNERY
COMPARE TYPES
THE "WHITE" HOPE


THE CONQUERING HERO COMES. MARK YOU—WHAT IS THAT MIGHTY SOUND? WITH CHEERS THE OWNERS DO RESOUND FOR TROPHIES FROM FAR AND WIDE THEY HOLD DUE TO THIS CONQUEROR—STRONG & BOLD. AND ALL HIS FOES ARE FILLED WITH DREAD, AH! ONWARD COMES "THE BRICTSON TREAD
A.O. BRICTSON— THE BRICTSON MFG. CO....
GLIDDEN TOUR

G. V. ELECTRICS

The sales of the General Vehicle Company are a pretty good criterion of the Electric Truck success

ABOUT a year ago when the tremendous reorder business of this company began to attract attention, its success was qualified by some in about this strain: "Oh, yes, they do pretty well with the brewers, express companies and electric light companies, but they don't get anywhere with really new business. They got the start by selling their (now) big customers a few years ago."

That sounds logical but it isn't exactly so.

A glance at some of the sales of the last 30 days (ending October 15th) is interesting. Just note the various lines of trade represented and the wide distribution of the orders:

Mt. Sinai Hospital (N. Y. City) - - - - - 1000 lb. Ambulance
First machine placed in service, June 20th, 1902.
Central Stamping Co., Newark, N. J. - 3½-ton truck (first order)
Parkhill Mfg. Co., Fitchburg, Mass. - 3½ " " " "
General Chemical Co., San Francisco - 2 " " " "
Wall Rope Works (N. Y. City)
Winch equipped - 5 " " " "
New England Tel. & Tel. Co., Boston - 2000 lb. wagon " "
Texas Lt. & Pr. Co., Waco - - - 2000 lb. wagon (first order)
Wells-Fargo Express Co., Chicago - 6 2-ton trucks } " Chicago
" " " " " - 3 3½-ton trucks } Order
W. H. Harrison Co., Cincinnati - - 2000 lb. wagon
(Coffee. Bought first wagon in 1905)
National Express Co. (N. Y. City) - 4 3½-ton trucks (first order)
And many others.

Nearly all these "first order" customers can use many G. V. Electrics and when the time comes we expect to get our share of the reorders. To sell progressively—as a firm adapts its delivery and shipping facilities so as to make each truck produce a saving—is better than "loading up" a customer for ten trucks before he is in a position to cash in on his investment. Many a big market has been closed because someone wanted "distribution" all at once. The race is not always to the swift.

Catalogue 84 on request

GENERAL VEHICLE COMPANY

Principal Office and Factory: LONG ISLAND CITY, NEW YORK

NEW YORK CHICAGO BOSTON PHILADELPHIA ST. LOUIS

Notes on the Cost of Motor Trucking

(*Continued from page 16*)

rates depending on the total kilowatt-hours taken. For comparative purposes the kilowatt-hours per car per mile taken by the various sizes of cars under various conditions is, therefore, of more value than the actual cost of the energy. The cost of electricity for any given rate can then be deduced directly from this figure.

The large variation in the watt-hours per car per mile for a given size of car is due to a number of factors, such as the battery equipment, the weight of the loads, the nature of roads and grades, the number of stops per mile, the kind of tires used, the average speeds and the care of the batteries.

Gasoline

In the table is given the number of miles per gallon of gasoline, under the stated conditions.

The gasoline consumption is affected by the nature of the service, roads, etc., in much the same manner as the energy consumption of the electric trucks. This accounts for the large variation in the miles per gallon in the various cases listed. For estimating purposes the figures given in the table and plot should therefore be used with due consideration of these items.

Lubricants and Garage Expense

The item of lubricants in several of the reports received is included in the garage charge, and in some of the reports on gasoline cars is included under gasoline.

In many cases garage space is rented. In other cases the user has his own garage, but charges against the car only the cost of the garage labor and maintenance. In only a few instances is the total cost of the garage, including interest and depreciation on the establishment, charged against the cars. Where a private garage is maintained the garage expense per car is of course much less when a large fleet is operated than when only a few cars are used.

Sundries, Driver and Helper

This item is naturally subject to great variations, depending upon the class of service and upon what is charged to this account in any individual case. In general, this account includes such special items as curtains, speedometers, etc., not originally supplied with the car, and such expenses as toll and ferry charges.

Chauffeurs' wages, as given in the reports, range from $2.25 per day to $3.25 per day for electric trucks, and from $2.50 per day to $4.00 per day for gasoline trucks. Helpers' wages range from $1.00 per day to $2.50 per day. The practice in regard to having two men on a truck is variable, depending upon the size of the truck and the nature of the service.

Amortization or Depreciation

The probable useful life of a motor truck is one of the most disputed points in connection with their use, and for the very good reason that none of the modern trucks have yet worn out. The manufacturers generally claim a life of ten years, whether their truck is an electric or gasoline machine. The more conservative users of trucks figure upon a life of from three to six years. The oldest electric truck now in service on which we have obtained any cost records is seven years old, and the oldest gasoline truck on which we have obtained cost records is five years old. One of the large breweries in New York City, however, has in service an electric truck purchased in 1901, and a large jewelry store an electric truck purchased in 1902. The oldest domestic gasoline truck still in service of which we have any knowledge is seven years old.

In order to take into account, in the annual expense, the gradual wearing out of the truck, a certain sum is usually charged against the truck each year. This charge is called either a depreciation charge or an amortization charge. Its amount of course depends upon the assumed life of the truck and upon the first cost.

The method now commonly used for figuring the depreciation charge is to deduct from the first cost of the machine the cost of the tires, and also, in the case of an electric, the cost of the elements of the battery which are renewed from year to year, and to take as the annual depreciation charge the remainder divided by the assumed life of the car. For example, if the car complete costs $4,000, including $400 for tires and $400 for the battery elements, and is assumed to have a life of ten years, the annual depreciation charge is $(4000-800)-10=\$320$.

When the depreciation account figured in this manner is carried on the books of the company as an expense item, the cost of the tires and battery elements for the new car must be charged to the operating expense of the old car. For example, assume that a set of tires and a set of battery elements each last just one year, and that the car is scrapped at the end of ten years. Then during the life of the car nine sets of tires and nine sets of battery elements will have been completely worn out and charged to the respective operating accounts. The total of the depreciation fund at the end of the ten years, however, is sufficient only for the purchase of a new car without tires or battery elements. Hence to provide for these items, the cost of the tires and battery elements for the new car must be charged against the tire and battery accounts for the old car. In other words, ten sets of tires and battery elements must be charged against the operating expense of the first car.

The above method of figuring depreciation is therefore permissible in making up estimates of the total cost of operation of a truck, only when the cost of the tires and the cost of battery elements originally supplied with the machine are included in the estimate of the annual cost of tires and battery elements. If, however, the estimate of the annual cost of tires and batteries includes only the cost of renewing these items, then depreciation should be figured on the entire first cost of the machine. Hence the necessity of distinguishing carefully between the total annual expense of tires and the cost of tire renewals, and the total annual expense of battery elements and the cost of renewing these elements.

The end of the useful life of a car is reached when the total annual cost of the car, including all charges, becomes greater than the total annual cost on a new car, plus the interest on the capital invested in the old car. Motor trucks have not yet been in use a sufficient length of time for one to make more than a very rough estimate of the length of this period, and even this rough estimate must be based largely upon judgment combined with a knowledge of the design of the car, the service in which it is to be used, and the care which will be taken of it.

It should be kept in mind that the life of a car in years depends to a very great extent upon the miles run per year, the design of the car, the care which is taken of it during its life, the maximum speeds at which it is operated, whether it is habitually overloaded, etc. There is also the possibility

that improvements in design may make it unprofitable to operate an old car even though it is still capable of giving good service.

Interest

In figuring the interest on a car, it should be remembered that the annual depreciation charges, even though they appear as expense items on the books of a company, do not represent an actual expense. The money represented by these charges is actually used in the business of the company, and may therefore be considered as earning a rate of interest equal to the rate of interest charged upon the amount invested in the truck. In other words, the depreciation fund may be considered as earning interest at the same rate as the interest on the truck investment.

This is practically equivalent to considering the amount charged off to depreciation each year as reducing the capital on which interest is to be taken by the amount of the depreciation charge. Consequently, when the depreciation charge is figured on the basis of the total first cost of the truck, including tires and batteries, the average interest charge throughout the life of the machine should be taken on only one-half the total investment. When the depreciation charge is figured on the first cost of the machine, less the cost of the tires and battery elements supplied with it, the total annual interest charge should be taken as the full interest rate on the cost of one set of tires and battery elements for a period equal to their life, plus interest for one year on half the amount on which the depreciation is taken. For example, if the total cost of a truck is $4,000, including tires at $400 and battery elements at $400, and the life of the car is taken as 10 years, and the tires and battery as one year, the average annual interest charge when depreciation is taken on $3200 (i. e., 4000—400—400) and the interest rate is 6 per cent. is .06 times 800 plus .06 times 3200-2 equals 48 plus 96 equals $144.

Administration and Insurance

Only a few of the companies thus far reported charge against the trucks any portion of the general administration and office expense. This charge in any case will depend upon the number of cars in service, the garage facilities, and the care which is taken in supervision and the keeping of records. The reports obtained upon this item range from $45 to $85 per car per year for cases where more than thirty cars are maintained.

The practice of the various companies in regard to carrying insurance also differs widely. The rate for fire insurance depends upon the amount of protection carried, and the age and value of the car, although a flat rate frequently exists for all models of electrics. The rate for liability insurance depends upon the class of service in which the truck is used. In only exceptional cases have trucks been reported as insured against either collision or property damage. The rates for all classes of protection differ in the various parts of the country. The item of insurance may, however, be estimated accurately in any individual case by obtaining quotations from the insurance companies.

Total Annual Cost

It is practically impossible to predetermine what will be the total annual cost of operating a truck of a given rating without knowing what will be the requirements of the service, the nature of the roads, and the general method of handling and caring for the cars. The difficulties involved in making up such an estimate are the relation between the various items of expense and the character of the work to be done, the nature of the roads and climate, and the system of operation. For example, the annual expense for tires depends upon the size and type of truck, the nature of the loads, the number of cars used (as this affects the number of tires purchased), distance traveled per day, days in service, road surface, climate, the practice regarding overloading and overspeeding, and the care taken of the cars.

Only by taking into account all the various interrelations, combined with a knowledge of actual operating costs under similar conditions, can one make an accurate estimate of the cost of operating a truck.

It can be realized that the data given in this paper is far from complete, and that much additional information on many points is needed. It is hoped, however, that the above presentation will bring out a full discussion which will supply some of this information. Attention might also be called to the fact that the information being compiled by the Institute of Technology will be summarized and published from time to time, and that a copy of each of these bulletins will be sent gratis, upon request, to any one interested in motor trucking. In this investigation the Institute desires to act as a clearing house for data of all kinds on the use of motor trucks. In view of the disinterested spirit in which this work is being pursued, it is justifiable to ask the hearty co-operation of all users and manufacturers of motor trucks, whether electric or gasoline.

BIEHL'S COMBINATION DEAD WAGON AND HEARSE

The illustration shows a body job made by Biehl's Carriage and Wagon Works, of 26-32 Pearl Street, Reading, Pa. The inside panels are removable and are draped inside of glass. They are trimmed in gray cloth in an artistic manner to match the silver gray paint on the entire job. The glass on the sides is bevel edged plate. The body is built up strong without being heavy and unwieldy. A feature is the side-door entrance. A folding step is fitted at the rear. The inside is finished in a natural finish besides having ample shelf room for chairs, etc.

Biehl's Combination Body, made by the Biehl Carriage and Wagon Works, of Reading, Pa.

In fair weather prepare for foul—buy trucks

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Steel Hoof Tractor

Here is shown the latest type of tractor as manufactured by the Lambert Gas and Gasoline Engine Company, Anderson, Ind. This tractor features what are called steel hoofs, which are cast metal plates, especially designed to clamp onto the outer edge of the power-transmitting wheels and so produce more tractive effort when running on soft ground. The Controlling mechanism is within convenient reach of the operator. A pulley projecting from the rear of the tractor can be utilized for running farm machinery.

INCREASED USE OF HIGH-GRADE CARS

From observation of the field of commercial cars in service it is evident that sales of high grade vehicles are heavy. There is much consolation in the thought that initial users of cars are spending their money for the best they can get, and in many instances it is a case of a single installation, not a fleet, where the next possible chance of a sale will be two, three or four years hence. The COMMERCIAL CAR JOURNAL representative has interviewed many users of cars as to reasons for their choice. To take users of individual cars only, the reply of one of them may well serve for the whole aggregation, "We could not afford but one car; that had to make good, therefore we bought the one that appeared to us to be the best."

It is a safe assumption that prospective users no longer regard the motor truck as an experiment; too many have been in service for too long a time. When a new car goes into service, eyes besides those of the owner observe its working. The high grade vehicle can stand the spotlight and it is because it has stood it, that it is in favor.

Classified Advertisements

SELLING AGENCY WANTED—ESTABLISHED TRUCK Company producing a high grade line of two, three and one-half and five ton trucks desires to communicate with substantial and established agency with a view to making contract for marketing its entire output on an extremely liberal commission basis. Address "K," care this Journal.

AGENTS WANTED FOR THE PALMER 1500-lb. TRUCK. Palmer-Meyer Motor Car Co., 5027-35 McKissock Ave., St. Louis, Mo.

WANTED—AN EXPERIENCED COMMERCIAL CAR salesman to travel Southern and Southeastern States and appoint agents. State experience and give reference in first letter. "Travel," care of this Journal.

THIS startling photograph shows the difference in resisting qualities between ordinary varnishes and

Vanadium Chassis Finishing

It is our automobile wheel exhibit at the Shows. It is varnished on half its spokes with a well-known gear varnish, and on the other spokes with our Chassis Finishing. It is then revolved for several hours in soapy water. The ordinary gear varnish is destroyed. Chassis Finishing is absolutely unharmed. It is the *only* varnish that resists soapy water, mud, road oil, etc.

Send for a free sample of Vanadium Chassis Finishing.

Valentine & Company

456 Fourth Ave. New York — 343 S. Dearborn St. Chicago — 74 Pearl Street Boston

TRADE VALENTINES VARNISH MARK

SHELDON

1913

ST.-1 ONE TON EQUIPMENT

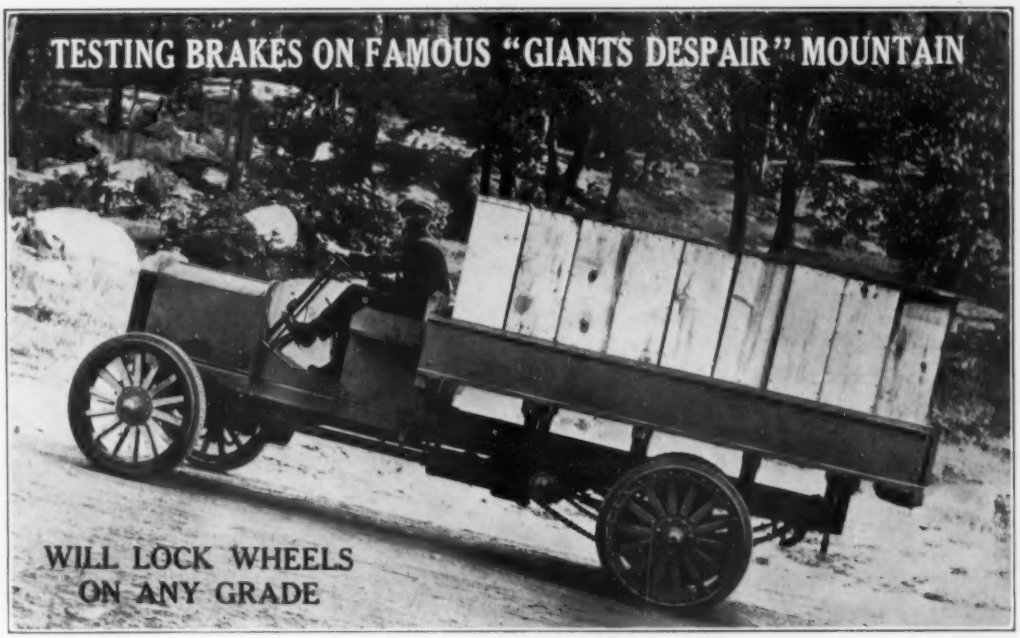
consisting of

FA-1 FRONT AND RA-1 REAR AXLES

EQUIPPED WITH STEEL WHEELS

E-11 BRAKES J-1 JACKSHAFTS

is now ready



What is more satisfactory than the knowledge that your car is always absolutely under control?

Fifty lbs. pressure on the foot pedal will positively bring the truck to rest in the shortest possible braking distance.

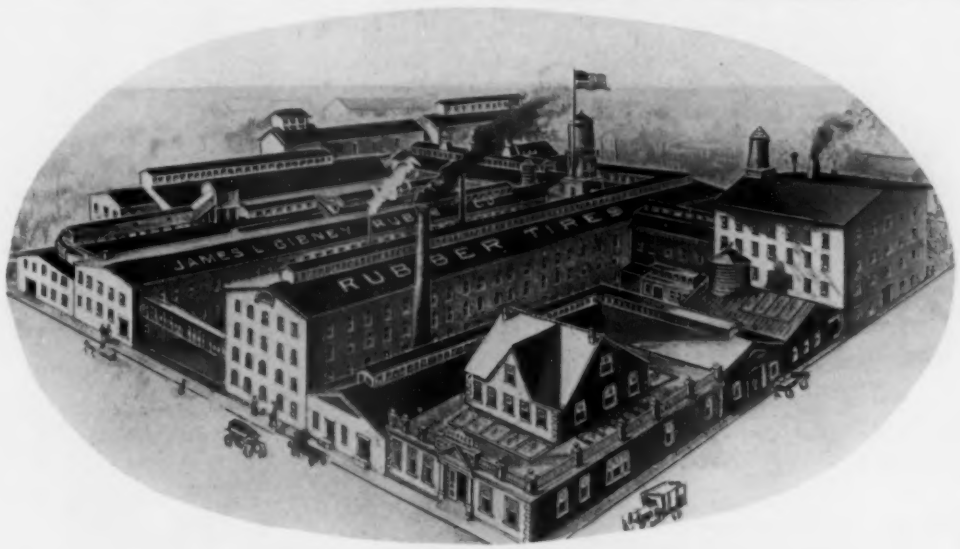
Allow us to give you facts

SHELDON AXLE COMPANY

WILKES-BARRE, PA.

CHICAGO BRANCH
68 East 12th Street

DETROIT BRANCH
1215 Woodward Avenue



Here is where we make

GIBNEY
WIRELESS TIRES

And Gibney tires have made

GOOD

WE ORIGINATE OTHERS COPY

That's why **Gibney Wireless Tires** are 3 years ahead.
Our experience is your protection.
Let us quote prices.

GIBNEY TIRE & RUBBER CO.

Factory, CONSHOHOCKEN, PA. PHILADELPHIA NEW YORK

The Bessemer Truck

Built in Three Sizes

1000 lb., $1200	2000 lb., $1800	3000 lb., $2100
102″ Wheelbase	120″ Wheelbase	136″ Wheelbase

A Few of the Many Features of Bessemer Construction:

Long Stroke Continental Motor	Unit Transmission and Jack-shaft Housing
Timken Axles and Bearings	Nickel Steel Gears Mounted on F & S Bearings
Left Side Drive	Platform Springs
Center Control	Accessibility of Working Parts

Now, Mr. Dealer, in simple justice to yourself you should investigate the Truck line we are offering. We can show you how to make money for yourself and save money for every one to whom you sell a truck.

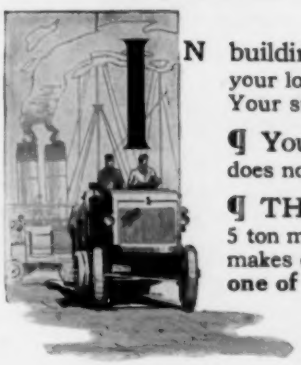
Our contracts are plain, man-to-man agreements. We ask you to sign nothing we would not sign ourselves.

"When You Buy a Bessemer You Buy the Best"

BESSEMER MOTOR TRUCK CO., Grove City, Pa.

THE Durable Dayton

A Word to Thinking Dealers



IN building a **lasting** business,—one which will endure indefinitely, your local business reputation must be backed up with dependable goods. Your success depends largely upon the product you sell.

¶ You cannot afford to sell your merchants a motor truck which does not possess lasting qualities.

¶ THE DURABLE DAYTON line of motor trucks (2, 3 and 5 ton models) rank exceptionally high in the industry. There are several makes of high-grade trucks on the market today—**the Durable Dayton is one of the several.**

¶ We seek business connections with that class of dealer who has the honest desire to build his business similar to that of this company. A business of stability, reliability and conscientious dealing.

¶ We are continually creating business for Durable Dayton Dealers with our national advertising campaign, sales co-operation and personal work in the field.

¶ We are best known by the expressed satisfaction of Durable Dayton users throughout the country.

Write promptly for detailed information and complete catalog

The Dayton Auto Truck Company, Dayton, Ohio

Factory Branch, 1700 Wabash Ave., Chicago

3 Ton Durable Dayton in Service with Sauer's Express—Springfield, Mass.

WILL REDUCE YOUR GASOLINE BILLS!

The Egyptian Mixer

has proved this fact to be true wherever it has been tested. It, therefore, is an indispensable part of every commercial car. It slips into the manifold above or ahead of carburetor. Takes but fifteen minutes to install.

IT WILL SAVE ITS COST IN TEN DAYS!

Proof of its efficiency is that in the Around-Lake Tour on October 27th, in the Staver Car No. 4, it was the only automobile which finished with a perfect score. **It is the only Mixing Device ever used successfully in Aeroplane Motors.**

Will be sent prepaid to anyone on receipt of $3.00. Made for all sized intake pipes,—from ¼" up to and including 2". If it does not save you 10% in fuel consumption and in other ways prove satisfactory, your money will be refunded.

This proposition is interesting alike to the COMMERCIAL CAR USER, DEALER and MAKER.

Write for further information

THE R. D. LOOSE MIXING CHAMBER COMPANY, 110 NORTH 5th ST. SPRINGFIELD, ILL.

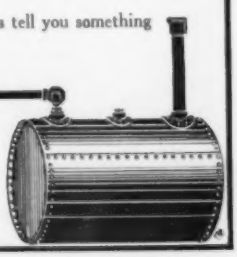
Ordinary Gasolene Boils at 113° F.

It throws off power-producing vapor at 60°. Doesn't it get that hot almost any day?

Is it any wonder that your truck "acts up" when you feed it gasolene out of a wooden barrel "faucet" or "jigger pump" tin can? How would your horses have acted if you had fed them cobs instead of corn? Do you think you would have gotten results?

You bought trucks because of their economy. Why not increase their economy still more by using a Bowser Underground Safe Storage System?

There is a system to fit your needs in size and price, crated and packed ready for installation. Let us tell you something about them. Send for Book No. 11.



S. F. BOWSER & CO., Inc., HOME PLANT AND GENERAL OFFICES FORT WAYNE, INDIANA

BRANCHES:—New York, Chicago, Minneapolis, St. Louis, Dallas, Atlanta, San Francisco, Denver, Toronto

Patentees and manufacturers of standard, self-measuring, hand and power-driven pumps, large and small tanks, gasolene and oil-storage systems, self-registering pipe-line measures, oil filtration and circulating systems, dry cleaning systems, etc. Established 1885.

SPLITDORF MAGNETO

"Always There"

The name of SPLITDORF has been synonymous with efficient and reliable electrical appliances for more than half a century.

From the manufacture of the famous Werner von Siemens magnetos in the '50's SPLITDORF coils, plugs and magnetos and now the SPLITDORF-LITE electric lighting generator have come along in convincing sequence.

Years of experience and the manufacturing and distributing concentration of to-day bear their logical fruit—SPLITDORF IGNITION devices represent ignition efficiency and reliability in their highest forms.

Write for our "Racing Record"

SPLITDORF ELECTRICAL CO.

98 Warren Street, Newark, N. J.

BRANCHES:

New York	Chicago	San Francisco
Boston	Detroit	Los Angeles
Philadelphia	Kansas City	Seattle
London	Buenos Aires	

Hard Truck Service

You have surely experienced spark plug trouble from time to time.

You have probably tried several makes of plugs.

You are probably tired of trying, as you find it expensive.

We would be glad to send you, ***on approval,*** a set of our indestructible AC 1913 plugs with unbreakable Steatite insulators.

Write Us

Champion Ignition Company
Flint, Michigan

One of the Squadron of Twenty-Four White Motor Trucks Owned by Armour and Company, Chicago, and Operated by them in the Principal Cities of the United States

WHITE MOTOR TRUCKS

The predominant use of White Motor Trucks by the foremost mercantile and manufacturing firms, not only in the United States, but throughout the world, is the most convincing proof of their superior merit in practically every line of service.

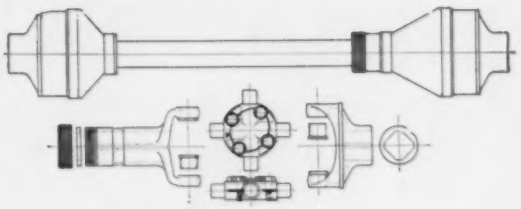
A Few Well-Known Owners of White Squadrons

American Can Company	Joseph Horne Company
American Chicle Company	Hudson's Bay Company
American Steel and Wire Company	Illinois Steel Company
Armour and Company	McCreery and Company
Berghoff Brewing Association	National Cash Register Company
Booth Fisheries Company	Pabst Brewing Company
Brazilian Government	Philippine Islands Government
Coca-Cola Company	Postum Cereal Company, Ltd.
Cudahy Packing Company	Remington Typewriter Company
Diamond Rubber Company	Russian Government
T. Eaton and Company, Ltd.	W. and J. Sloane
Marshall Field and Company	Standard Oil Company
Gimbel Brothers	United Cigar Stores Company
B. F. Goodrich Company	United States Government
Gulf Refining Company	Winchester Repeating Arms Company

White Motor Trucks are built in capacities of 3-4, 1 1-2, 3 and 5 tons, and all models are uniform throughout in parts and design, thus making them the most practical for the standardization of delivery or transportation service. Literature and detailed information furnished on request.

Gasoline Motor Cars, Trucks and Taxicabs

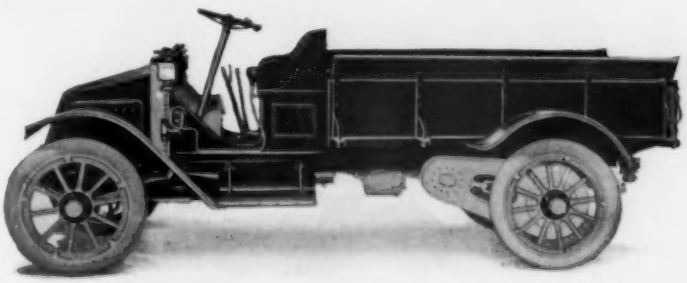
The White Company
Cleveland



P-30 Drive

We supply single universals or drive shafts complete as shown. Forgings are special analysis steel, heat treated, machine work accurately done. Note extreme simplicity of design, insuring long life.

The Otto Konigslow Mfg. Co.
CLEVELAND
Sixth City
Sales Agents: THE ZINKE CO., Chicago



"Sandusky" Model "B" 1500 lb. Delivery Truck

Long stroke, 4-cylinder motor, 30 H. P.
Selective sliding gear transmission.
120 inch wheelbase.
Double chain drive.
Chains enclosed in aluminum cases.
Center control, left-hand steering.

PRICES:

Chassis - - - - -	$1400.00
Chassis with Express Body -	1475.00
Chassis with Covered Delivery Body	1500.00

DEALERS:—Write for agency proposition. Do it now. It is the best buy in the world today.

Sandusky Auto Parts & Motor Truck Co.
Sandusky, Ohio, U. S. A.

THE W. F. STEWART CO.

ESTABLISHED 1881 INCORPORATED 1898

FLINT, MICHIGAN

WE BUILD BODIES

for both pleasure and commercial vehicles, and can give you goods and service that can be depended on. The price, too, will be right. Get in touch with us.

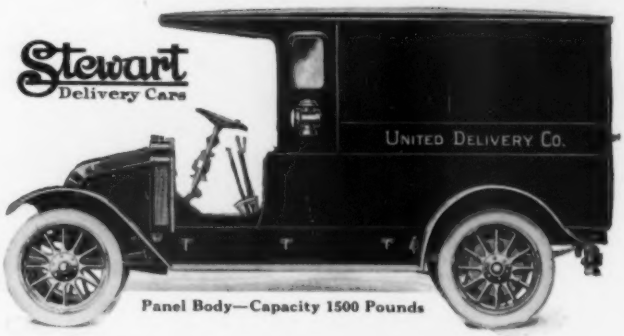
PRESSED STEEL

FRAMES

FOR TRUCKS

Handsome, Light, and more enduring than those made of rolled channel

A. O. SMITH COMPANY
MILWAUKEE



Panel Body—Capacity 1500 Pounds

These Features Sell Stewart Cars

Everything of the highest grade—all features most up-to-date and practical. Stewart delivery cars are made to give the best service, to keep always "on the job," to operate most economically. No expense or trouble has been spared to make them the best light delivery trucks on the market.

Notice these general specifications of Stewart Delivery Trucks:

Continental Motor—30 h. p., very quiet, 4-cylinder, recirculating oiling system. Valves enclosed.
Selective Transmission, Brown & Lipe make. Timken roller bearings.
Three Speeds forward, one reverse.
Multiple disc clutch, dry plate type.
Genuine Cellular Radiator at dash, well protected, beautiful sloping hood.
Timken Axles, with Timken roller bearings throughout running gear.
Bosch Magneto—no spark lever, no batteries, timer, etc.
Five to one ratio, special full floating rear axle. Seventeen-inch brakes.
Left-hand steering, center control.
Wheel base 126 inches. **Demountable rims; big tires.**
Large grease cups everywhere required.
Chassis price $1650. All types of bodies.

Write for our catalog and dealership proposition

Stewart Motor Corporation. Buffalo. N.Y.

T. R. Lippard, Pres. and Mgr. R. G. Stewart, Vice Pres. and Chief Eng'r
R. P. Lents, Sec. and Treas. Robt. W. Ingersoll, Sales Mgr.

Magneto Money

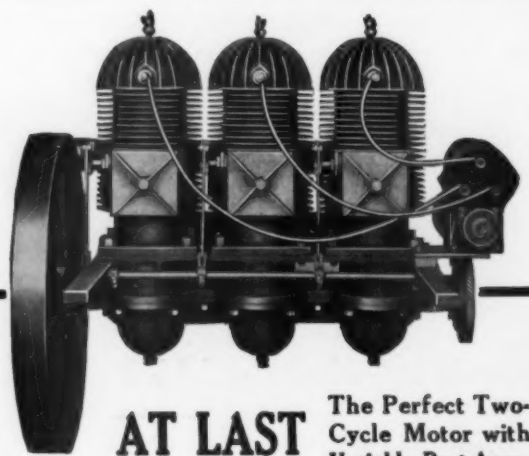
SAVED BY BUYING NOW

$30.00 for a $105.00 6 cylinder
$20.00 for a $93.00 4 cylinder
$18.00 for a $65.00 2 cylinder
$16.00 for a $60.00 1 cylinder

Imported U. & H. High-Tension Magnetos Less than Import Cost

Circular and Price Lists Free

J. S. BRETZ COMPANY
250 W. 54th Street
NEW YORK



AT LAST The Perfect Two-Cycle Motor with Variable Port-Areas

The essential feature of Moore Motors is the increasing or decreasing of all the port-areas simultaneously (fully patented), giving flexibility of control and fuel economy.

(Fixed ports, as in regular two-cycle design, mean lack of flexibility and high fuel consumption.)

The result is a power plant combining two-cycle simplicity and low upkeep cost, with four-cycle flexibility of control and fuel economy.

Moore Motors are backed by years of engineering experience. Send for descriptive circular.

PALMER-MOORE COMPANY
SYRACUSE, NEW YORK

To Owners or Prospective Owners of Commercial "Electrics"

The battery is the most important part of your car. It is a subject which claims your most careful consideration. A large majority of electric vehicles are equipped with

"Exide" Batteries

These batteries—the "Ironclad-Exide", "Exide", "Hycap-Exide" and "Thin-Exide" will give more miles at less expense than any other battery made.

We want to send you a bunch of letters written by electric vehicle users about "Exide" Batteries. This is real evidence. Our nearest Sales Office will mail them to you on request. They are worth writing for.

THE ELECTRIC STORAGE BATTERY CO.
PHILADELPHIA

New York Chicago Cleveland Detroit San Francisco
Boston St. Louis Atlanta Denver Toronto

Motz Cushion Tires

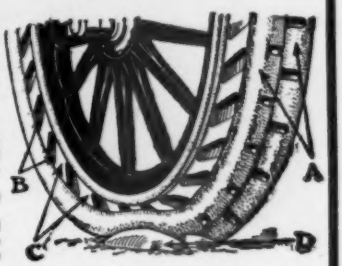
Are Trouble-Proof and Easy-Riding

Motz non-skid cushion tires are so constructed as to give the utmost service with practically no repair expense.

The double tread makes skidding virtually impossible on slippery streets throughout the winter.

Undercut sides and slantwise bridges support the tread and make the tire practically as resilient as a properly inflated pneumatic tire.

These easy-riding qualities protect the delicate mechanism of your car from the constant pounding over rough roads. They do away with the vibration which crystallizes the steel parts and causes them to break. They make your tire puncture-proof and free from costly blowouts. They increase the length of the car's life.



You'll get more miles of service at less cost than from any pneumatic tire.

Any car, on a given charge of fuel, will travel farther and faster when equipped with the Motz non-skid cushion tire. This means low operating cost to you.

You get a guarantee of 10,000 miles—two years.

These tires fit any standard clincher, universal quick-detachable or demountable rim. They are easy to apply.

You have asked for an economical tire. Here it is—economical in every sense. Letters from users everywhere substantiate this claim.

Write for our booklet 85.

(A) shows double, notched treads.
(B) shows undercut sides.
(C) shows slantwise bridges.
(D) shows absorbing means when passing over an obstruction.

THE MOTZ TIRE & RUBBER CO.
Factories and Executive Offices, AKRON, OHIO

BRANCHES:
New York Chicago
Detroit Pittsburgh Cleveland
Kansas City Boston Philadelphia

AGENTS:
Mound City Sales Co. - - St. Louis
Imperial Motor Co. - Washington, D. C.

The majority of trucks have been standing idle half the working day.

How about yours? Do you know?

The Travelog would show you and enable you to get service that pays.

A time clock recording runs and stops

W. H. BROWN, ROSE BLDG., CLEVELAND, OHIO

Agents Attention

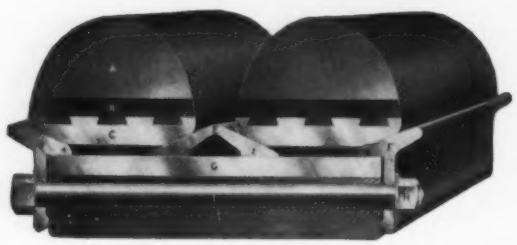
You have no doubt been trying to make up your mind as to what line of motor trucks will make you the best proposition for 1913. If you are not posted on the ADAMS—write us at once for details. Increased production will enable us to take on a few more good agents in unassigned territory.

Adams Trucks
"Deliver the Goods"

In writing, state facilities for handling the business, as well as territory desired.

THE ADAMS BROS. CO.
FINDLAY, OHIO

The
United States Standard Motor Truck Tire
(Demountable)



has established standards of tire economy never before known.

No more delays while tire replacements are being made. Changes can be made by the driver **anywhere** in fifteen minutes' time or less.

Guaranteed for 10,000 miles if used in one year.

Write us for descriptive literature.

United States Tire Company
New York

From start to finish

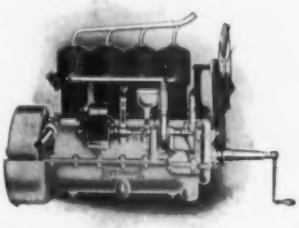
The problem of economical hauling is solved and the line of deliveries is straightened by the power wagon that is free from motor troubles. No matter whether you need a truck capable of hauling the heaviest loads of bulky freight, coal, ores, iron, or general merchandise, or whether you require a light, swift-running delivery car for retail work,

THE RUTENBER MOTOR

should throb under your hood. It means efficiency, endurance, rugged honesty of service, economy of maintenance and unfailing power. For high speed or low, for heavy work or light, or for combination uses, the RUTENBER Motor is the motor of Performance.

More than a score of the highest grade cars in America today are equipped with RUTENBER Motors. The best of trucks are those which place their reliance on the RUTENBER.

Send for Booklet.



The Rutenber Motor Co.
Marion, Indiana

Motor
Lauth Juergens
Trucks

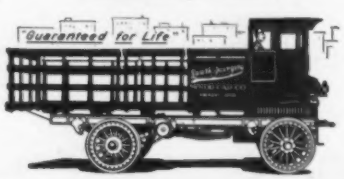
Are Guaranteed For Life

WHAT MORE CAN WE SAY?

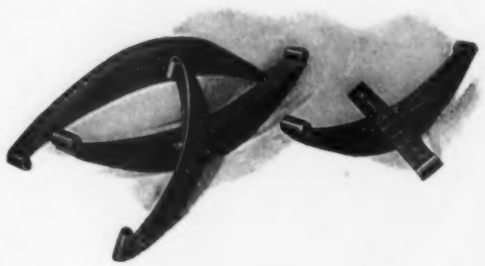
Made in 1, 2, 3 and 5-Ton Sizes

Send for Catalogue

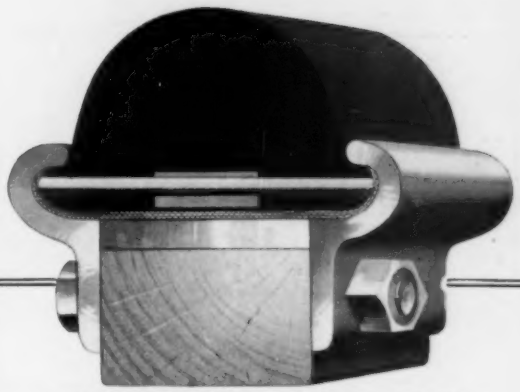
The Lauth-Juergens Motor Car Co.
FREMONT, OHIO



"Reliable Springs are More important on Commercial Cars than on Pleasure Cars."



THE PERFECTION SPRING CO.
Cleveland - - - - - Ohio



REPUBLIC MOTOR TRUCK TIRES

Just as a chain is no stronger than its weakest link, so a truck is no more efficient than its tires. Republic Motor Truck Tires will increase the efficiency of your trucks by keeping them on the road day after day, by cutting down the cost of maintenance. Let us show you in dollars and cents.

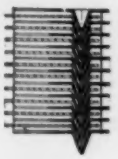
THE REPUBLIC RUBBER CO., Youngstown, Ohio

These Branches and Agencies will supply you with truck tires and truck tire service:

Albany, N. Y.—Albany Vulcanizing Works
Atlanta, Ga.—The Republic Rubber Co., 237 Peachtree St.
Boston, Mass.—The Republic Rubber Co., 735 Boylston St.
Buffalo, N. Y.—The Bison Rubber Co.
Chicago, Ill.—The Republic Rubber Co., 1732 Michigan Ave.
Cleveland, Ohio—The Way-Mitchell-Rigdon Co., 5919 Euclid Ave.
Dallas, Texas — Slaughter - Randal Co., 2033 Commerce St.
Denver, Colo.—The W. C. Hendrie Rubber Co., 1238 Broadway
Detroit, Mich. — Republic Rubber Co. of Mich., 1001 Woodward
Kansas City, Mo.—Bart S. Adams, 1513 Grand Ave.
Los Angeles, Cal.—Republic Tire & Rubber Co., 1227 S. Olive St.
Minneapolis, Minn.—The Republic Rubber Co., 1514 Hennepin Ave.
New York, N. Y.—The Republic Rubber Co., 229 West 58th St.
Philadelphia, Pa.—The Lyman Tire & Rubber Co., 328 N. Broad St.
Pittsburgh, Pa.—Lange Motor Truck Co., S. St. Clair and Eva Sts.
Rochester, N. Y.—Rochester Auto & Supply Co., 352 Main St., East
Salt Lake City—The W. C. Hendrie Rubber Co., 210 S. W. Tempie
San Francisco, Cal.—Republic Rubber Co. of Cal., Golden Gate Av. & Hyde St.
Seattle, Wash.—Republic Tire Co., 1425 Broadway
Spokane, Wash.—Interstate Rubber Co., 417 First Ave.
St. Louis, Mo.—The Republic Rubber Co., 1215 North Broadway
St. Paul, Minn.—The Republic Rubber Co., 76 West 7th St.
Washington, D. C.—J. M. Doyle, 320-2 Pennsylvania Ave.

"EVANS" MODEL "HELE-SHAW" CLUTCH

(Patented)



Multiple Disc Running in Oil

The illustration shows wedge shaped annular grooved plates which engage smoothly, *have a grip like iron* yet are *slippable indefinitely.*

Phosphor-Bronze vs. mild steel.

In use on over 100,000 cars.

Send for Catalog No. 7 to-day, giving bore and stroke of motor

SHORTEST—BEST—CLEANEST

M & E GREASE CUPS

(Patent Pending)

Are Rapidly Becoming Standard of the World. The Top end of Spiral Spring acts as a pawl, catching in corrugations in the Top of cup—See top of spring marked "B". When cap is turned, the pawl slips from notch to notch and prevents vibrating loose. See notches marked "A". The cup can be freely moved with slight force in either direction. Used exclusively on all Packard and Pierce-Arrow Trucks and many others.

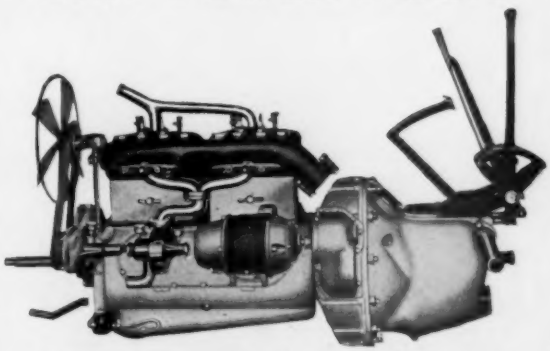
Write for catalog No. 23 now

Merchant & Evans Co., Philadelphia

(Premier Metal House in America)

Wheeling New York Chicago Baltimore Brooklyn Denver Cleveland Kansas City

HAZARD UNIT POWER PLANT



Motor, Clutch, Transmission and Gear Shift Control all in One Compact Outfit.

Center Control, Three Point Suspension, Oil Tight, Dirt Proof.

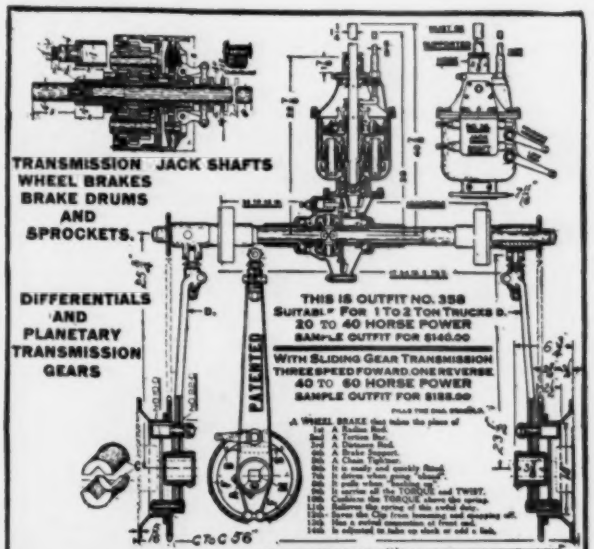
Gear Reduction Integral with Unit Power Plant permits straight line shaft drive to live rear axle. Automatic inclosed Governor.

No Time Limit to Our Guarantee.

Full Descriptive Catalog on Request.

HAZARD MOTOR MFG. CO.

841 Coates Street, ROCHESTER, N. Y.



HEAVY BUILT SLIDING GEAR TRANSMISSIONS 3 SPEEDS FORWARD. ONE REVERSE FOR 20 TO 60 HORSE POWER. FOR TRUCKS CARRYING 1 TO 4 TONS

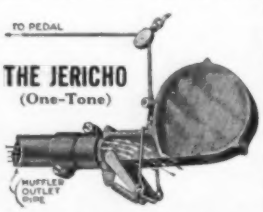
MUNCIE GEAR WORKS. MUNCIE. IND.

The Momentum of a Heavy Commercial Car Makes a Sure, Prompt and Efficient Signal Absolutely Necessary

JERICHO
THE PERFECT MOTOR CAR SIGNAL

Jericho is everywhere regarded as standard equipment for commercial cars. It is dependable in every emergency.

For the delivery wagon, which is all day in the crowded streets, or the interurban express and moving vans going long distances over winding country roads, there is no horn that approaches Jericho.



Jericho always works promptly and costs nothing to maintain.

Send for free Booklet 5 about Jericho and other automobile accessories.

The Randall-Faichney Company, Boston, Mass.

Also makers of Jubilee Horn, B-Line Guns, MacKae Blitz Spark Plugs and other Automobile Accessories.

Ford
THE UNIVERSAL CAR

If he keeps two cars the chances are that one is a Ford. And now that big production has brought prices down to hard-pan, a much larger number of Fords will go to owners of heavier and more expensive cars.

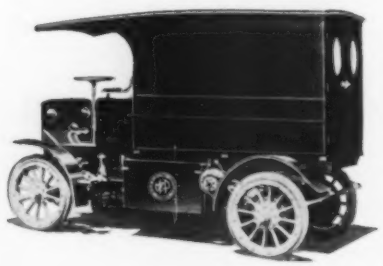
Runabout - - - -	$525
Touring Car - - -	600
Delivery Car - - -	625
Town Car - - -	800

These new prices, f. o. b. Detroit, with all equipment. An early order will mean an early delivery. Get particulars from Ford Motor Company, Detroit, Mich.

M&P ELECTRIC VEHICLES · DETROIT ·

"Made to Make Good and It Does."

Electric Delivery Vehicles
1000 lbs. and 2000 lbs.
100% Service



Write for New Catalog—now ready

M & P Electric Vehicle Co.
Detroit, Michigan

Many Accidents
Due to Faulty Brakes

Don't take chances. Be sure and certain about the brake equipment on your trucks. Brakes that won't act instantly—that won't hold your truck forward or backward—are not the kind of brakes you want.

DUPLEX EXTERNAL BRAKES

Will hold a truck from moving backward as well as forward.

They are **real** brakes. They act instantly with slightest pressure. Large braking surface, finest material, best design.

Specify DUPLEX Brakes on the truck you buy. If you have had brake trouble—write us.

The Royal Equipment Company
484 Housatonic Ave, Bridgeport, Conn.

We also make Raymond Brakes, Raybestos Brake Lining and Gyrex, the Mixer.

Remy Magneto

Exchange Your Old Magneto for a New Remy

IT will cost you practically no more than what you will be forced to pay out for constant repairs on your present ignition system. A new Remy will give your car new life. Here is our exchange proposition:

	List Price	Allowance	Net to You
2-Cylinder Remy Magneto with Coil, complete	$46 00	$ 9 20	$36 80
4-Cylinder Remy Magneto with Coil, complete	50 00	10 00	40 00
6-Cylinder Remy Magneto with Coil, complete	52 00	10 40	41 60

Allowance made for any make of Magneto

Remy Electric Company
Anderson, Indiana

BRANCHES:—New York, Boston, Detroit, Chicago, Kansas City, San Francisco, Indianapolis.

SERVICE STATIONS—Albuquerque, Augusta, Baltimore, Charlotte, Cincinnati, Cleveland, Denver, Dallas, El Paso, Houston, Jacksonville, Louisville, Memphis, Minneapolis, New Orleans, Nashville, Norfolk (Va.), Omaha, Los Angeles, Philadelphia, Pittsburgh, Portland, (Me.), Portland (Ore.), Rochester, San Antonio, Seattle, Spokane, St. Louis, Syracuse, Utica, Washington (D. C.).

CANADA—Toronto, Winnipeg, Calgary, Hamilton, Vancouver, Montreal.

Coventry Noiseless Chains as Used on "Benz" Engines

COVENTRY

NOISELESS CHAINS

Have been the standard of Europe for many years. These chains run with remarkable accuracy and precision, their construction and design make them positive and flexible.

Standard equipment on the following cars: **Daimler, Deasy, Humber, Maudslay, Benz, Arrol-Johnson, Vauxhall, etc.** Write for full description and details.

UNITED STATES REPRESENTATIVES:

Sarco Engineering Co., 110 Broad St., N. Y.

Decatur 1½ Ton Truck

The Truck with a reputation for

Economy Efficiency Durability and Low Operating Cost

Our Trucks are used in 61 different lines of business. Write for catalog and complete specifications telling WHY DECATUR TRUCKS ARE BEST.

Grand Rapids Motor Truck Co.
Grand Rapids, Michigan

The worm gear drive of Pierce-Arrow Trucks delivers more of the generated power to the rear wheels than is possible by any other means, because it is the most *direct* and *efficient* drive—demonstrated for ten years in England—and proven in this country for over two years in every class of light and heavy service in which Pierce-Arrow worm driven trucks have been operated.

PIERCE-ARROW
5-TON MOTOR TRUCKS

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.

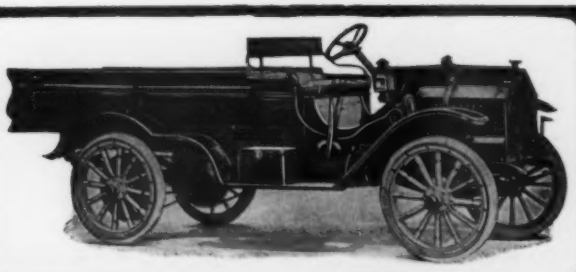
FLEXIBILITY SAVES THE GEARS

SHOCK LOADS IN MOTOR CARS are enormous. Even ordinary speeds on average roads produce vibrations which would make any riding impossible without the use of springs, absorbers, etc.

NO PRINCIPAL MEMBER of the motor car even approaches a condition of absolute rigidity. An automobile bearing, then, whose successful operation depends upon accurate alignment of frame and shafts cannot give its best service under these conditions.

MIGHTY LITTLE FLEXIBILITY is in a solid ball or roller. The one bearing in which it really exists is the Hyatt. There the spiral rolls carry gears in accurate mesh under service conditions, at the same time cushioning shocks and relieving surrounding parts of excessive strains and stress.

Hyatt Roller Bearing Company
DETROIT, MICHIGAN

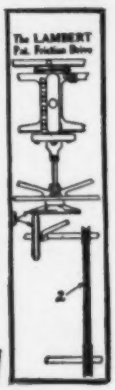


THE LAMBERT MOTOR TRUCK

The first investment is not the most important consideration in the purchase of a motor truck. It is important that you study the construction—what will it cost you in time and money to get like results from different types of cars?

The Lambert Patented Friction Drive will give you more service at less expense than any truck built. This is apparent by studying the illustrations in this advertisement. That on the left shows the usual form of power transmission. That on the right the **Lambert Patented Friction Drive.** Six expensive complicated units, as compared to two simple components. Granted that the results from the gear transmission are equal to the friction, which is the more economical? The cost of lubricating oil alone in the one on the left, will amount to more than the replacement of parts on the **Lambert Friction Drive.**

The Lambert is trouble proof, and cannot be damaged by carelessness or inexperience. It overcomes the chief objection to commercial cars.



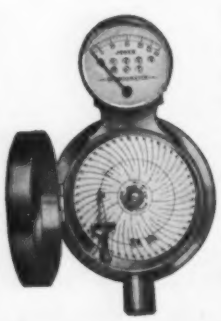
We have prepared some very interesting literature for you. A card brings it to you.

The Buckeye Manufacturing Co.
146 Columbus Avenue
ANDERSON, INDIANA

A WATCHMAN'S CLOCK ON YOUR TRUCK—

"YOU CAN'T BEAT IT"

JONES RECORDER



Tells you of every movement of your truck or delivery wagon. It gives a daily chart showing how fast, how far your vehicle traveled, when it stopped, how often and how long.

Write for Particulars

THE JONES RECORDER
Broadway at 76th St. : New York

"HARTFORD" CONE CLUTCH THE BEST

Furnished with Double Set of Universal Joints. Clutch can be removed from car as a unit without disturbing other parts. We furnish either Pressed Steel or Aluminum Cone. Weight same. Complete equipment 30 lbs. Made in two sizes, 25-30 and 35-40 H. P. Price is Right.

HARTFORD AUTO PARTS COMPANY
HARTFORD, CONN.
The J. S. Bretz Co., New York, Detroit, Sole Selling Agents

MERCURY TRUCKS

1000 lbs. Capacity

The result of 10 years' experience proves it not an experiment.

You may as well buy now.

Our product is standard, changes are unnecessary, and there will be no yearly models.

Manufacturers not assemblers.

The Mercury Manufacturing Company

4106 S. Halsted Street, Chicago, Illinois

A Wonderful Tire *for* Speed and Resiliency

Goodyear Demountable Cushion Truck Tires

Before buying truck tires, be sure to investigate the 7 great Goodyear Truck Tires, including the Goodyear Demountable Cushion—the tire remarkable for its durability and resiliency. This is the supreme tire for high speed trucks and trucks that require greater resiliency than given by ordinary solid tires.

GOODYEAR
AKRON, OHIO
Motor Truck Tires
S.A.E. Standard

See the Demountable Cushion—the only Demountable Cushion Truck Tire in existence. See, too, the Goodyear Solid Demountable 10,000 Mile Truck Tire—one of the greatest time and money savers ever invented.

See the Goodyear Individual Block Truck Tire—one made up of blocks every one of which is independent of the others.

These and four other *Saving Truck Tires* are explained in a large circular for which we ask you to write. Each tire described is a *finished* product—*perfected* for its purpose by tire experts of over 13 years experience. Each has certain advantages not found elsewhere. Write today giving name and model of your truck. Address

The Goodyear Tire & Rubber Co., Akron, Ohio

Branches and Agencies in 103 Principal Cities

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits

Main Canadian Office, Toronto, Ont. Canadian Factory, Bowmanville, Ont.

Motor Truck Bands

MADE WITHIN THE FOLLOWING

Dimensional Tolerances

(Adopted by the Society of Automobile Eng.)

1.—Tolerance in circumference of felloe band:

	Plus	Minus
Before application to wheel	1-32″	1-32″
After " " "	1-16″	1-32″

Variation from precise measurement shall be uniform over entire width of band.

2.—Tolerance in width of felloe band:

	Plus	Minus
Up to and including 4″	1-32″	1-32″
4—1-16″ to 6″	3-64″	3-64″
6—1-16″ to 12″	1-16″	1-16″

3.—Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1-32″ up to and including 6″ width. Over 6″ width within 1-16″.

4.—Variation in thickness of band: .006″ plus or minus.

5.—Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1-16″ plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

The Standard Welding Company

CLEVELAND

NEW YORK CHICAGO DETROIT

MOTOR TRUCK

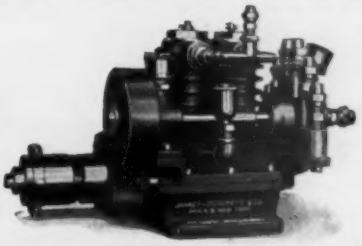
STRONG STURDY

LEAKLESS

ALL SIZES IN STOCK

COMPRESSED AIR MOTOR TRUCK STARTERS

STARTS MOTOR PUMPS TIRES

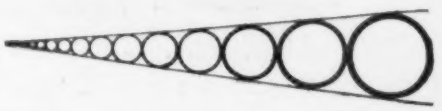


PURE AIR is SAFE and CLEAN
AIR PRESSURE TANKS—ALL SIZES

JANNEY-STEINMETZ --- PHILADELPHIA

AUTOMOBILE TUBING

Seamless Brass and Copper Tubing



of all kinds,—any size, any gauge, any temper
From ½″ down to the finest.

We are supplying many of the largest and best automobile concerns in the country with tubing. Why not let us quote you on your requirements? Our **QUALITY** is guaranteed,—our prices are low as quality will allow, and prompt deliveries are guaranteed. Could you possibly ask for more? **Correspondence solicited.**

ROME HOLLOW WIRE & TUBE COMPANY - Rome, New York

THE KINSEY MANUFACTURING CO.

TOLEDO, OHIO

Manufacturers of Auto Parts—

Kinwood Radiators, Fenders
Kinwood Oilers, Gaskets
Kinwood Steel Frames, etc., etc.

SPECIAL METAL STAMPINGS

BUCKEYE Motor Truck Jacks

Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

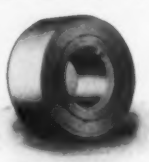
Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity		List Price
7	11¼″	6⅛″	18″	16 lbs.	2½ tons	with formed handle	$10.00
13	14¼″	7⅛″	20⅛″	26½ "	3 "		15.00
14	14¼″	7⅛″	20⅛″	33 "	5 "		16.00
9	11⅛″	6″	17⅛″	10 "	1½ "		6.00

Write today for descriptive catalog. Made only by

THE BUCKEYE JACK MFG. CO., Alliance, Ohio

QUALITY PLUS QUANTITY



American-Made for American Trade

Ten acres of floor space busy twenty-two hours a day manufacturing ***guaranteed*** New Departure ball bearings for the American trade.

Made in Three Types:

Double row, combined radial and thrust. Single row, taking radial load only. "Radax," taking radial and axial loads.

If you are using anti-friction bearings, you ought to know about the guaranteed New Departure. Write for catalog.

THE NEW DEPARTURE MFG. CO., Bristol, Conn.

Western Branch, 1016-17 Ford Bldg., Detroit

KOEHLER COMMERCIAL CAR

CARRYING CAPACITY 1600 LBS. $ PRICE 750.

The Maximum Car at Minimum Price

Open Flare-Board Type

Large and roomy. Inside measurements, 44 inches wide, 84 inches back of driver's seat to rear. Flare-boards, 17 inches above floor. Strongly ironed throughout, also ironed to receive four-post canvas top, which can be had from stock at $40 additional. **Capacity,** 1600 lbs. **Price,** $750. Prices of various types of bodies range from $40 to $150 extra.

All styles of bodies are obtainable. **KOEHLER** is built in Newark, N. J. and is backed by an organization of integrity and capital.

ADDRESS ALL CORRESPONDENCE TO

H. J. KOEHLER S. G. CO.

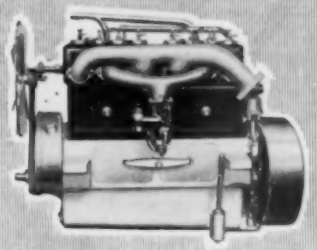
1709 Broadway, New York, N. Y.

THE Waukesha Long Stroke Truck Motor is constructed to fulfill every obligation of the truck manufacturer to the purchasers of his trucks. It gives the purchaser what he expects—and what he pays for—namely: *efficiency, reliability, dependability, workability.* Its immense capacity for hard work and hard knocks is due to design and construction of unusual merits.

Like Uncle Sam's war-dogs, the Waukesha is built to *resist* the forces of destruction.

WAUKESHA

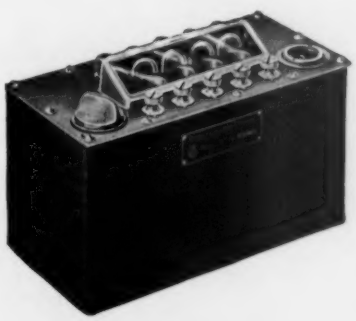
4¼×6¾" LONG STROKE TRUCK MOTOR



Strength of construction is not the Waukesha's sole merit. It has the remarkable fuel economy of ½ of a pint of gasoline per horse power per hour. It's a motor with unlimited strong selling features for your truck—because it makes good every promise your guarantee contains.

We'll be glad to send detailed information on request.

WAUKESHA MOTOR CO., Dept. A, Waukesha, Wisconsin



Detroit Oilers have no ball checks

There are no check valves or other complicated parts in Detroit Mechanical Force Feed Oilers to give trouble and cause failures. Every drop of oil **must** go to the place where it is needed.

A separate pump for each feed measures the oil and insures a rate of feed that is **exactly** right at all times. Once properly regulated there is no chance for faulty lubrication and dry bearings, carbonized cylinders, smoke at the exhaust and wasted oil are entirely eliminated.

Detroit Oilers are made with from one to thirty feeds in capacities of two pints to five gallons—pulley, sprocket, ratchet or gear drive.

Made also with two compartments for feeding one kind of oil to cylinders and another to the bearings.

Write today for catalog P-67 and full information.

DETROIT LUBRICATOR COMPANY.

DETROIT, U. S. A.

Largest Manufacturers of Lubricating Devices in the World.

Money to Burn

Gasoline is increasing in price. Its cost is a great consideration. The running of engines while cars are standing idle is waste. Fuel so consumed shows you have money to burn.

If You Don't Want to Burn it

Remember the

"DISCO"

SELF-STARTER

will help you cut out this leak. No driver will hesitate to stop his engine if he does not have to crank it.

Mr. Car Owner: Write us for printed matter, and let us show you how to cut down running expenses.

Mr. Car Maker: Equip your engine with the Disco Self-Starter and increase your sales by proving economy.

Ignition Starter Company

708 Dodge Building Detroit, Mich.

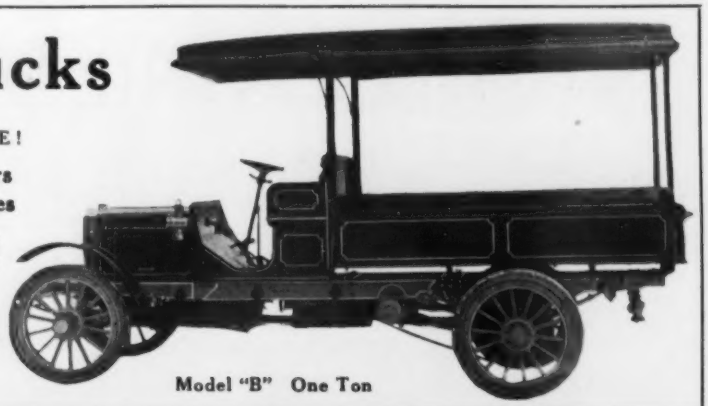
Atterbury Trucks

DELIVER THE GOODS!
THE PERFECTLY BALANCED MACHINE!

Gasoline and Electric Delivery Cars
Motor Trucks Hotel Omnibuses

Write for catalog and details. We are pioneers and can supply any size or type for your purpose.

Atterbury Motor Car Co.
BUFFALO, N. Y.



Model "B" One Ton

BOLLEE LAUTH-JUERGENS RANDOLPH SEAGRAVE KISSEL GRAND RAPIDS SCHNEIDER KINNEAR PEERLESS RENAULT

ADLERWERKE

BALL BEARINGS

"INSURANCE FOR BUILDER AND USER"
RHINELAND MACHINE WORKS CO
140 WEST 42nd ST. NEW YORK, N.Y.

HISPANO-SUIZA

GEBRUDER STOEWER ARIES KELLY NAGANT PANHARD PEUGEOT DELAHAYE MACK DE DIETRICH AUTO-METALLURGIQUE

WESTON MOTT CO.
FLINT, MICH.

AXLES, HUBS, RIMS

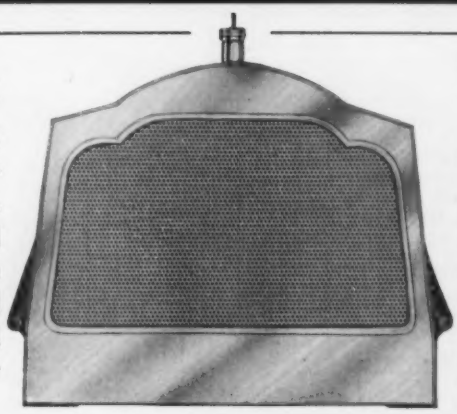
OF HIGHEST QUALITY

Strength and durability are factors of the utmost importance and our products are made to meet the severest tests.

FEDDERS

Real Square Tube Radiators

¶ Commercial cars require radiators that will stand many shocks and much hard usage. This was one of the weak parts of the commercial car but the test of time has proved that FEDDERS radiators render efficient service.



¶ We want to figure with you your requirements for the coming season. If you haven't used Fedders radiators you probably have had a great deal of radiator trouble and you may think that there isn't a radiator built that will give you satisfaction. If this is the case we would like to have an opportunity of demonstrating that the Fedders radiator will stand the wear and tear and shocks of the commercial car and that manufacturers who equip their commercial cars with the Fedders have practically no radiator trouble. We can convince you. Will you give us the opportunity?

FEDDERS MFG. WORKS
BUFFALO :: NEW YORK

INTERLOCKING SPOKES Make Schwarz Wheels Strongest

A commercial truck is built to carry weighty loads, and it must be strongly built.

The weight of the truck and its load rests upon the wheels.

The wheels should be as strong as they can be made.

Strength and safety are assured if a truck is equipped with Schwarz Wheels. Interlocking spokes and tight, immovable center assemblage in Schwarz Wheels make for the greatest possible strength, endurance and safety.

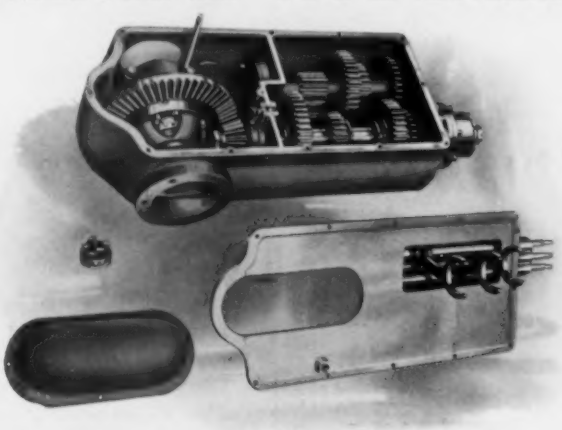
Write us about design and proportion.

The Schwarz Wheel Company
Frankford, Philadelphia

WARNER-TOLEDO

Write us relative to our durable and efficient

COMMERCIAL TRANSMISSIONS



5 to 6 Ton Capacity

The Warner Manufacturing Company
Toledo, Ohio, U. S. A.

Hydraulic Pressed Steel Co.

TRUCK FRAMES

½ TON TO 10 TON

HYDRAULIC PRESSED STEEL CO.

CLEVELAND, OHIO

R. B. McMULLEN, General Sales Agent, Chicago, Ill.

Send for this book

Cramp's Gear Bronzes for Rear Axle Drive

THE modern up-to-date drive for both touring cars and trucks is a steel worm and a bronze worm wheel. Our gear metals long ago passed the experimental stage. We have been manufacturing worm drives for nearly 100 years for all kinds of machinery from turret turning gear to lifting bridges, elevators, marine railways, etc., and we are now furnishing our worm gearing for automobiles.

Our metals will better resist wear and abrasion, have longer life and higher efficiency than any other gearing metals and have the great strength necessary to resist heavy starting torque. They are designed to withstand excessive strain and shock and this strength is given to them without impairing their wearing and antifrictional qualities.

There is no need of importing bronze wheels for worm drives

We manufacture better material and you save DUTY, FREIGHT and TIME

Send for new booklet

The William Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa.

GAYLOR GRIPS

THE FEDERAL CHAIN & MFG. CO. beg to announce that they have acquired exclusive rights to manufacture "GAYLOR" GRIPS and will continue to market them under the same trade name.

"GAYLOR" GRIPS are being extensively used in all parts of the United States and are to-day considered the STANDARD solid tire grip for Commercial Vehicles.

The "FEDERAL" traction grip for solid tires will also be manufactured by this Company.

As the LARGEST makers of Traction Grips for Solid Tires in the UNITED STATES, we are justified in stating that our grips *must* be the best, our methods *must* reflect honesty and fair dealing, and our prices *must* represent true economy to the user.

For the particular benefit of the Commercial Car owner we have published an authoritative treatise on Traction Grips.

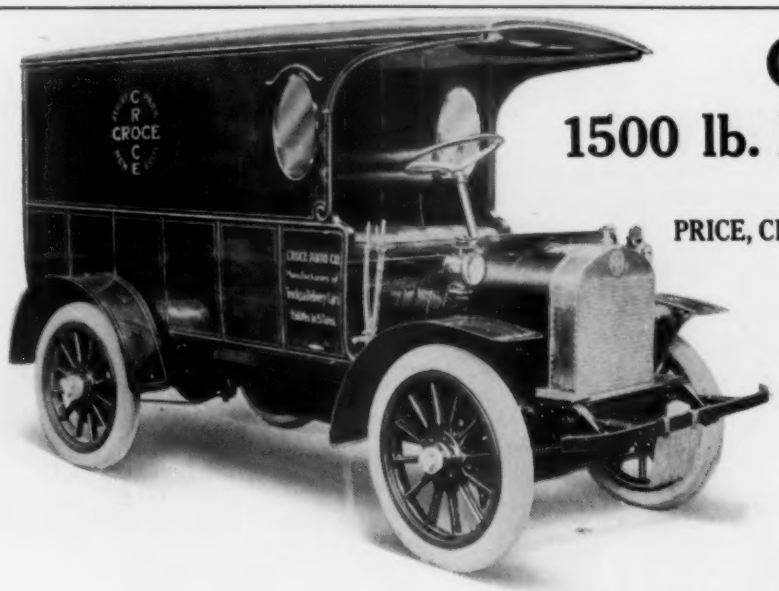
The booklet tells in a concise manner of those necessary and desirable features that ANY grip MUST possess if it is to give satisfactory results, when used on SOLID TIRES.

We respectfully advise a careful reading of the facts presented.

A copy will be mailed to those interested—no obligation incurred.

FEDERAL CHAIN & MFG. CO.

SPRINGFIELD, MASS.



CROCE

1500 lb. Delivery Wagon

(Closed Body)

PRICE, CHASSIS, $1,650. COMPLETE, $1,850

Croce Commercial Cars are in a class by themselves, just the car the business men have been looking for so long. The best materials that money can buy are none too good for Croce Cars.

THE CAR THAT IS BUILT TO LAST TEN YEARS. Built fool-proof. Anyone can handle it without injuring the car.

There are some men who figure economy in the buying of a car by the lower price; the wise men figure on the life of the car.

There are many cars built for one year's service, two years the limited life. Those cars sell for about half the price of the Croce Car, which is built to last ten years and will outwear five other makes of cheap cars with less trouble and expense. Where does the economy come in?

SPECIFICATIONS OF CROCE 1500 lb. DELIVERY CAR:—

Motor, 4 Cylinder, 4-cycle block, with 3 main large bearings (crank shaft 1½). **Bore** 3½, stroke 5 inches, L-head. **Magneto,** Bosch High tension. **Carburetor,** Schebler Model L. **Clutch,** Cone, pressed steel with roller control; no wearing parts except when changed speed; **Croce Patent. Joints, Spicer universal,** on clutch and rear. **Transmission,** 3-speed and reverse, sliding gear type, with Timken roller bearings. **Rear axles** full floating type, the largest Timken make, with Timken roller bearings. **Tires,** 34-4½ front and rear (pneumatic). **Front axle,** Timken front with Timken roller bearing on wheel and head. **Radiator,** tubular type, Kells make, with Croce patent soled bottom; guaranteed never to leak or get out of order (barring accident). **Steering Gear,** screw and nut type, every wearing part automatically taken up, with no back lash. **Springs,** Croce design, for easy riding with and without load; special chrome vanadium spring steel of the highest grade.

Croce Commercial cars are not built of cheap materials to meet others in price, but are built on sound business principles for the business man who wants a car to last 10 years, and for the man who knows a good car when he sees it.

The first Croce car was built in 1905; all our product was sold, and built up a reputation locally in New Jersey, until this year, when a large plant is under way with 40,000 square feet of floor space.

Good territory is now open for the sale of Croce trucks of from 1500 lbs. to 5 tons capacity. Send for Catalogue and full information.

CROCE AUTO CO., ASBURY PARK, N. J.

OUR NEW MODEL "C"
Panel Body, Four Cylinder, 20 H. P., Bosch Magneto, Pneumatic Tires—32x3½—Complete, $875.00. Motz Solid Tires—34x2½—Complete, $825.00

DEALERS—

We invite immediate correspondence concerning territorial selling arrangements for 1913. We want to hear from that type of dealer who recognizes the exceptional money-making opportunity in selling

The Commerce Car

Three models—one chassis. At a price—$850—that makes the **Commerce** a **self-seller.** If you want the big profits to be had in truck selling, **here is your opportunity.**

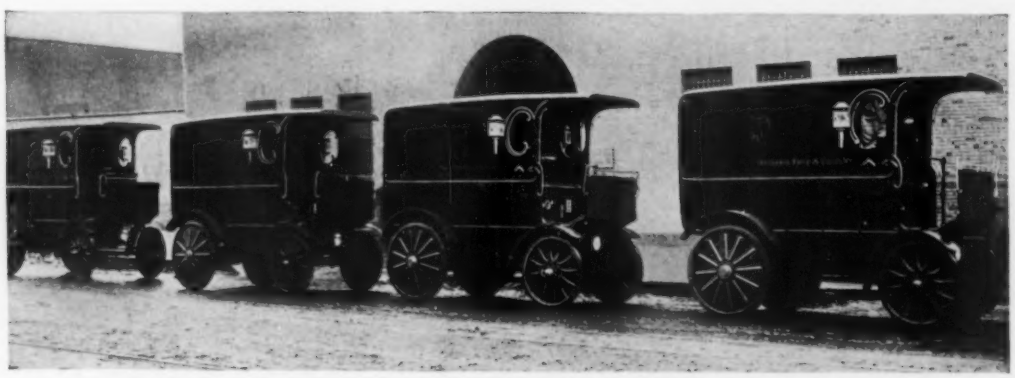
The Commerce is a **specially built** commercial motor car—not a "converted" pleasure car. Load capacity—1000 pounds. **Built for work.**

Investigate the financial stability of our Company—we give references and require them. Ask any of our dealers for their opinion of **The Commerce** and the rapid sales possibilities.

The winter season is approaching—the best time for motor truck selling. Get in line now and secure **your** share of the business.

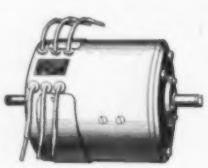
THE COMMERCE MOTOR CAR COMPANY

General Offices: 633-639 Penobscot Building ∴ **DETROIT, MICHIGAN**



Some of Marshall Field & Company's Electric Delivery Wagons with Westinghouse Motors

Electric Delivery Marks the Efficient Store



The most ably managed stores use electric delivery wagons because experience has proved them to be more rapid, economical and reliable than any other kind of vehicle for delivery purposes.

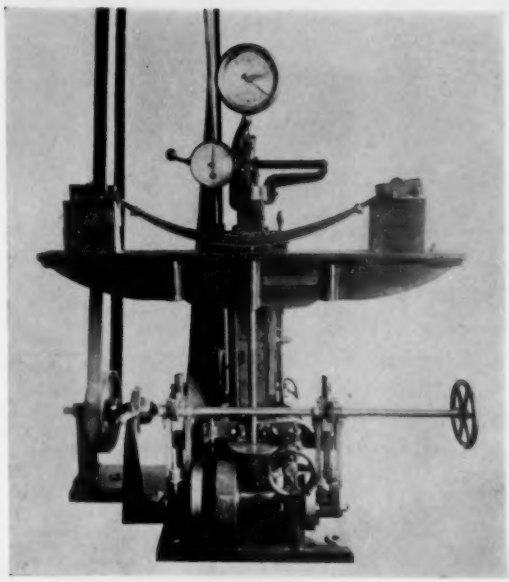
Westinghouse Motors Mark the Most Reliable Electric Vehicles

The builders of the best electric vehicles use Westinghouse vehicle equipment because its long record of satisfactory operation proves its high efficiency and thorough reliability.

See that your electrics have Westinghouse Equipment.

Westinghouse Electric & Manufacturing Company Sales Offices in Forty-five American Cities **East Pittsburgh, Pa.**

VANADIUM



The Anti-Fatigue Steel

This Vanadium Steel Spring was deflected through 14⅝ inches under a load of 2700 lbs. without taking a permanent set.

Vanadium Steel Springs surpass all others in endurance and resiliency. Specify them.

Our Ferro-Vanadium is the Standard for Making Vanadium Steel

Booklets and expert advice on application

American Vanadium Co.

Largest Manufacturers of Vanadium Alloys in the World
Immediate shipment—any quantity

339 Vanadium Bldg., Pittsburgh, Pa.

CULLMAN SPROCKETS and Differentials

in stock and to order.

Send for catalog and let us quote you on your requirements.

CULLMAN WHEEL COMPANY, CHICAGO

1351 GREENWOOD TERRACE

LAVIGNE

Steering Gears

POSITIVELY

No Back Lash
No End Thrust
No Loose Parts

Takes Up Automatically

Positive
Compact
Dust-Proof
Irreversible

FOR TRUCKS
DELIVERY WAGONS
TAXICABS

THE LAVIGNE GEAR CO.
Corliss, Wisconsin

Truck Economy is Dependent

Upon Knowledge of Truck Mileage

Veeder

Hub Odometer

$25

At Your Dealer's or
Direct from Factory

You, as a commercial car user, must look upon the money paid for trucks as just as much of an investment as money paid out for supplies, additions, stocks, etc., and *you should insist on a proper return from this investment as well as upon the others.*

To make your truck investment pay it is ***absolutely essential*** that accurate records be kept of the distance the truck travels. By such records, and only by these records, can you check your tire guarantee, your drivers' capabilities, gasoline and oil consumption per mile, cost per ton for each mile, etc., etc.

The VEEDER HUB ODOMETER will do this necessary work for you. It registers backwards as well as forward. It is sealed, so cannot be tampered with or altered. It simply takes the place of the regular hub cap and ***can be attached by any mechanic.***

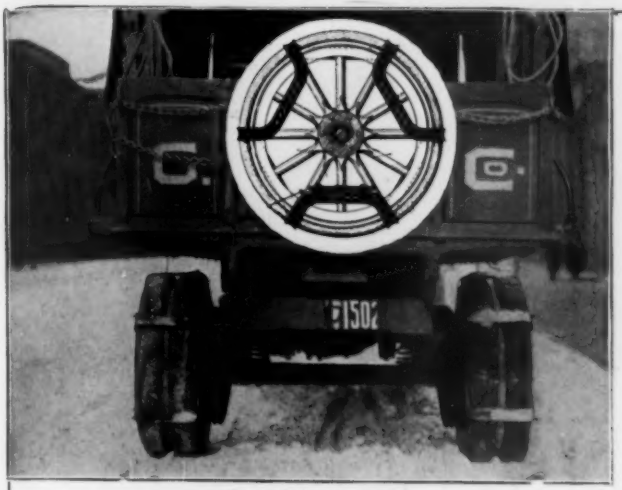
No Intricate Wiring, No Cables
No Magnets, No Tubes

All we need to know is make, model, size of wheel and year of manufacture of your truck. We ship the HUB ODOMETER to you and you do the rest. Being made by the Veeder Manufacturing Company, whose recording instruments are world-famous in all lines of business, is a sufficient guarantee that the VEEDER HUB ODOMETER is simple, accurate and durable.

Send for Catalogue D, descriptive of HUB ODOMETER.

The Veeder Manufacturing Co., Hartford, Conn.

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings.



Lyon Grips in Service

LYON GRIPS are expressly made for solid tires. They are wholly unlike chains, and they do not wear out rapidly, break, or injure the tires. They are

Guaranteed for 2500 miles.

Catalog, with full explanation of their principle, on request.

Order Now

and get prompt delivery!

With the opening of winter, truck users are reminded of the need of a traction device for mud and snow.

About the first of December we are deluged with orders for

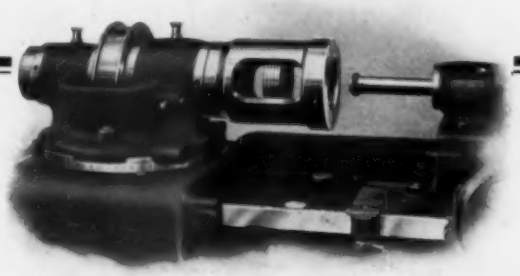
Lyon Solid-Tire Grips

The diversity of tire sizes and styles makes it impossible to carry a stock, hence the grips are made up on order only.

Order yours **now**—ahead of the rush—and be sure of having them when you want them!

Lyon Grips do not annul the tire makers' guarantee.

LYON NON-SKID COMPANY, 433 North Broad St., Philadelphia, Pa.



The Chuck for Holding Thin Bushings Without Distorting Them

Does easily what is difficult to do with a three-jaw chuck.

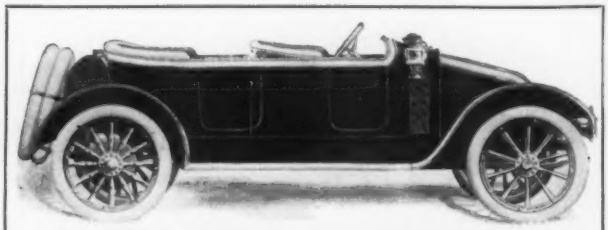
Can be attached quickly to the nose of the work spindle of the ***Heald Grinding Machines.***

Is easy and rapid to operate, and locates the bushing so that only a small amount of stock need be removed to obtain a round hole.

Maximum capacity, 4" diameter by 4½" long, and will handle different sizes of work that otherwise would require several chucks.

This fixture fully described in our booklet *"Practical Hints on Internal Grinding,"* pages 18 and 19, which will be gladly sent on request.

The Heald Machine Company, 12 New Bond Street, Worcester, Mass.



The Features the Buyer Wants in Distinctive and Distinguished Cars

CROXTON

Croxton Cars incorporate all of the features for which the buyer looks in the new season models.

Moreover, many of these have been in use on our cars for five years; so, with us at least, they are not experimental.

Others—which some day we predict will be widely adopted—are yet exclusive to the CROXTON.

These are even more valuable to you in a sales way than those which have now become more or less common in other cars.

A glance at what follows will show you that no car is more complete, of more advanced design or more completely equipped:

Short Turning Radius.

Extremely long and flexible Springs.

Quick Detachable Demountable Rims.

Electric Starting and Lighting System.

An extremely long stroke motor; improved ignition system with automatic spark advance, dispensing with spark lever on steering wheel.

Improved Thermo-syphon cooling system.

Radiator protected from damage and from mud and water splashing by being placed at rear of motor; no hot air from radiator passes over motor. Improved oiling system. Left-hand drive, with steering gear of new design. Center control. Clutch and transmission enclosed as a unit. Gasoline tank incorporated with cowl dash. Motor protected by hood from dust, dirt and water.

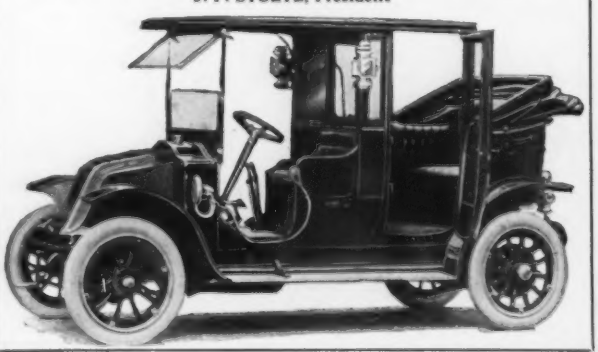
Particularly attractive and distinct body lines.

We are now located in our new factory, with the best and latest machinery, and most complete facilities.

Our Sales Force is yet to be completed by the addition of a few good dealers.

Full details and specifications will be mailed for the asking.

THE CROXTON MOTOR CAR CO., WASHINGTON, PENNSYLVANIA
J. P. STOLTZ, President



Be Careful In Buying Batteries

Don't let any salesman entice you into paying triple price for a storage battery because of long-time guarantee and promised capacity increase. As you may have learned from bitter experience, some makes of batteries are still too young to prove the ratio of real to guaranteed life, and capacity increase does not always materialize.

Salesman's arguments to customers may be theoretically splendid, but here is how the battery maker may talk to his salesman: "This battery is good for a year and worth $10. Sell it for $30, with three years' guarantee. When the customer kicks, hand him another of the batteries he has already paid for. Might as well collect for three batteries at once and keep competitors out. Maybe your man won't come back for the other batteries; if he does he will think we are white on replacements."

Now Gould Batteries are not sold that way. Their price each is for one honest, efficient, long-lived battery, consistently guaranteed for a reasonable life. The buyer is left free to purchase any make without loss at renewal time, but every battery user is ready and glad to duplicate his Gould Battery voluntarily when that time comes. He has found the Gould capable of delivering rated capacity from beginning to end of a long life—throughout a period easily equal to or greater than the guaranteed life.

The Gould Battery has years of service records to prove it tried and true. If you wish to base your next battery purchase on facts, on close personal investigations and tests, on interesting performance figures, tell us your requirements.

Gould Storage Battery Co.

General Offices: 341 Fifth Ave., New York

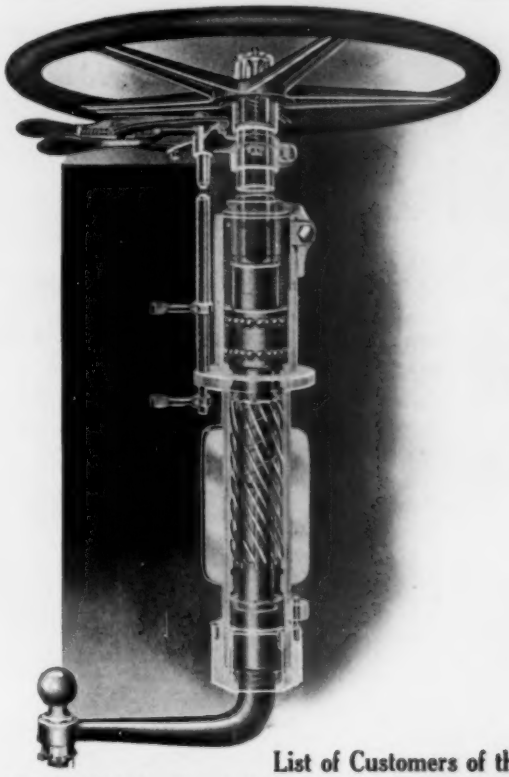
Boston: 89 State Street. San Francisco: 904 Rialto Bldg.
Chicago: The Rookery. Cleveland: American Trust Bldg.

WORKS: Depew, N. Y.

Agents in Washington, D. C.; Kansas City, Mo.; Denver, Col.; Detroit, Mich.; Topeka, Kan.; Los Angeles, Cal.; Seattle, Wash.; Montreal and Toronto.

Full stock carried in all cities where we have offices or agents.

29



110 Truck Manufacturers

equip their trucks with Ross Steering Gears. A year ago 60 truck manufacturers used our Steering Gears. This is an increase of 83⅓ per cent in one year.

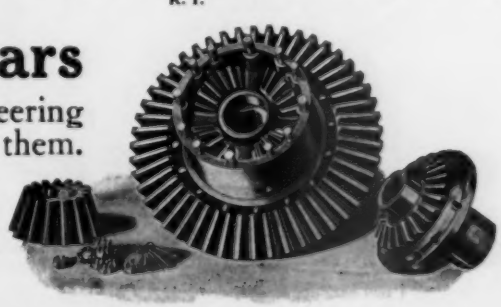
Below we give a list of the 110 truck manufacturers using the Ross Steering Gears.

List of Customers of the Ross Gear & Tool Co., Lafayette, Ind.

Atlantic Vehicle Co., Newark, N. J.
Alma Mfg. Co., Alma, Mich.
Ahrens-Fox Fire Engine Co., Cincinnati, O.
Argo Electric Vehicle Co., Saginaw, Mich.
Avery Co., Peoria, Ill.
H. W. Bell & Co., New York, N. Y.
Brasie Motor Truck Co., Minneapolis, Minn.
Bowling Green Motor Car Co., Bowling Green, O.
Bronz Electric Vehicle Co., New York, N. Y.
W. H. Budreaus, Indianapolis, Ind.
Buckeye Mfg. Co., Anderson, Ind.
J. A. Burns & Co., Washington, D. C.
Canadian Commercial Motor Car Co., Windsor, Ont.
Cartercar Co., Pontiac, Mich.
Continental Motor Truck Co., Denver, Colo.
Cass Motor Truck Co., Port Huron, Mich.
Champion Wagon Co., Owego, N. Y.
Clark Delivery Car Co., Grand Crossing, Ill.
Commercial Auto Co., Milwaukee, Wis.
C. De L. Engineering Works, West Nutley, N. J.
Edward S. Clark, Boston, Mass.
Dain Mfg. Co., Ottumwa, Ia.
Danielson Engine Works, Chicago, Ill.
Davis Manufacturing Co., Milwaukee, Wis.
Dayton Auto Truck Co., Dayton, O.
Diamond T Motor Car Co., Chicago, Ill.
James C. Doyle, Portland, Ore.
Empire Automobile Co., Glens Falls, N. Y.
Four Wheel Drive Auto Co., Clintonville, Wis.
Franklin Boiler Works Co., Troy, N. Y.
Furnas Office & Bank Funiture Co., Indianapolis, Ind.
Garford Co., Elyria, O.
Gramm Motor Truck Co., Lima, O.
Gramm Motor Truck Co. of Canada, Walkerville, Ont.
Gramm-Bernstein Co., Lima, O.
Grand Rapids Motor Truck Co., Grand Rapids, Mich.
Harder Auto Truck Co., Chicago, Ill.
Harvey Motor Truck Co., Harvey, Ill.
Hoffman Motor Truck Co., Minneapolis, Minn.
Harwood Barley Mfg. Co., Marion, Ind.
Joshua Hendy Iron Works, San Francisco, Cal.
Hercules Motor Truck Co., Chicago, Ill.
Ice Mfg. Co., New York, N. Y.
Juno Motor Truck Co., Juneau, Wis.
Kanawa Mine Car Co., Charleston, W. Va.
Kanawa Motor Truck Co., Charleston, W. Va.
Kelly Motor Truck Co., Springfield, O.
Kentucky Wagon Mfg. Co., Louisville, Ky.
Kinnear Mfg. Co., Columbus, O.
A. R. King Mfg. Co., Kingston, N. Y.
Kissel Motor Car Co., Hartford, Wis.
Knox Automobile Co., Springfield, Mass.
Knickerbocker Ice Co., Chicago, Ill.
Kopp Motor Truck Co., Buffalo, N. Y.
Lauth-Juergens Motor Car Co., Fremont, O.
Lewis Motor Truck Co., San Francisco, Cal.
W. H. McIntyre Co., Auburn, Ind.
McConnay & Torley Co., Pittsburgh, Pa.
Mack Bros. Motor Car Co., Allentown, Pa.
Marquette Motor Vehicle Co., Chicago, Ill.
Martin Carriage Works, York, Pa.
F. L. Moore Motor Truck Co., Los Angeles, Cal.
Geo. Mansur Co., Haverhill, Mass.
A. Meisler & Sons, Sacramento, Cal.
Merchants Automobile Co., Chicago, Ill.
Monitor Automobile Works, Janesville, Wis.
Moreland Motor Truck Co., Los Angeles, Cal.
Morgan Motor Truck Co., Worcester, Mass.
Mogul Motor Truck Co., Chicago, Ill.
Motor Conveyance Co., Milwaukee, Wis.
Nelson & Lee Moon, Chicago, Ill.
New Haven Truck & Automobile Works, New Haven, Conn.
Northern Motor Car Co., Kingston, Canada
Old Reliable Motor Truck Co., Chicago, Ill.
Ohio Electric Car Co., Toledo, O.
Packers Motor Truck Co., Wheeling, W. Va.
Pope Mfg. Co., Hartford, Conn.
Phoenix Iron Works, Winona, Minn.
Randolph Motor Car Co., Flint, Mich.
Rapid Motor Vehicle Co., Pontiac, Mich.
Rector Engineering Co., New York, N. Y.
Reliance Motor Truck Co., Owosso, Mich.
Robinson-Loomis Motor Truck Co., Minneapolis, Minn.
Rowe Motor Co., Coatesville, Pa.
Sandusky Auto Parts & Motor Truck Co., Sandusky, O.
Schmidt Bros. Co., Chicago, Ill.
Seamless Pressed Steel & Mfg. Co., Red Key, Ind.
Service Motor Car Co., Wabash, Ind.
Sheldon Axle Co., Wilkes-Barre, Pa.
Speedwell Motor Car Co., Dayton, O.
Stegeman Motor Car Co., Milwaukee, Wis.
Sternberg Mfg. Co., Milwaukee, Wis.
Teel Mfg. Co., Boston, Mass.
Transit Motor Car Co., Louisville, Ky.
Toledo Motor Truck Co., Toledo, O.
Universal Motor Truck Co., Detroit, Mich.
Van Winkle Gin & Machine Co., Atlanta, Ga.
V. C. Motor Truck Co., Lynn, Mass.
Victor Motor Truck Co., Buffalo, N. Y.
Weber Auto Truck Mfg. Co., Louisville, Ky.
Westfield Motor Truck Co., Westfield, Mass.
White Star Motor & Engineering Co., Brooklyn, N. Y.
Waverley Co., Indianapolis, Ind.
Witt-Will Co., Washington, D. C.
Willys-Overland Co., Indianapolis, Ind.
Walker Vehicle Co., Chicago, Ill.
Woodworth Motor Truck Co., Providence, R. I.

Ross Differential Gears

are built as well as the famous Ross Steering Gears. It would pay you to investigate them.



Write for Catalog

ROSS GEAR & TOOL COMPANY

790 Heath Street LAFAYETTE, IND.

MACK

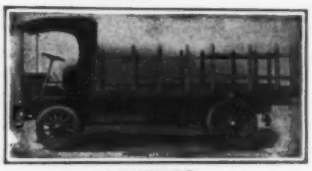
COMMER

SAURER

POLACK TYRES

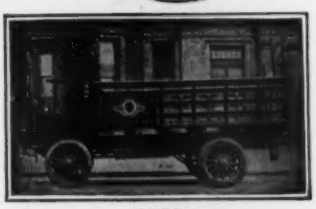
10,000 MILES
CONTINUOUS SERVICE

POLACK TYRES

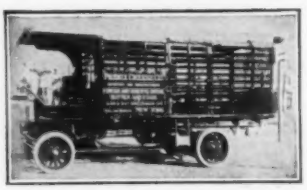


GARFORD

POLACK TYRES give a greater continuous mileage than any other truck tyre manufactured.



ALCO



KNOX

POLACK TYRES have the maximum resiliency and will reduce your expense for mechanical repairs.

PACKARD

GENERAL VEHICLE

POLACK TYRE & RUBBER COMPANY

Main Offices:

Ehret Bldg., Broadway and 59th St.
New York City

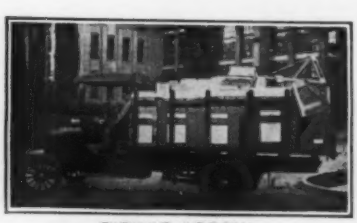
BRANCHES:

146 Summer St. Boston, Mass.
1114 Michigan Ave., Chicago, Ill.
247 Jefferson Ave., Detroit, Mich.
512 Mission St., San Francisco, Cal.
516 Parkway Building, Philadelphia, Pa.
505 Liberty Ave., Pittsburgh, Pa.
917 First Ave., So. Minneapolis, Minn.
930 South Main St., Los Angeles, Cal.
915 E. 15th St., Kansas City, Mo.
Petty Tire & Rubber Co., St. Louis, Mo.

GRAMM

Use them on your Electric Truck and increase its battery efficiency and thereby the radius of operation.

Use them on your Gasoline Truck and keep it on the road earning money instead of in the repair shop losing money.

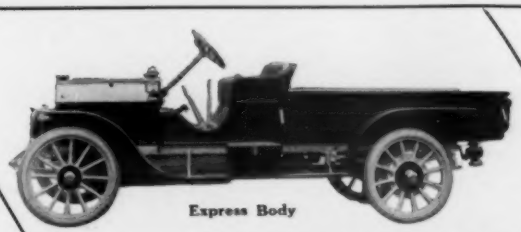


PIERCE-ARROW

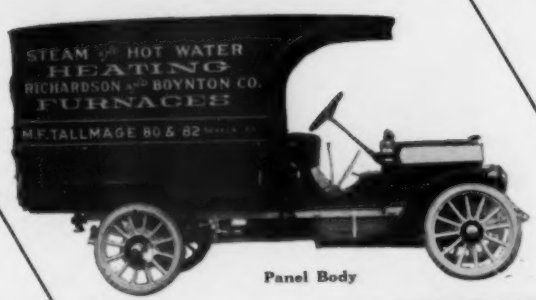
COMMER

"The Menominee"
Motor Truck

1500 lbs. Carrying Capacity, Express or Stake Body - **$1200.00**
2000 lbs. Carrying Capacity, Express or Stake Body - **$1500.00**

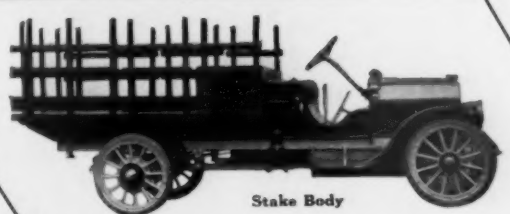


Express Body



Panel Body

Express Body With Top Over Driver's Seat



Stake Body

Special Features In
"The Menominee"

Four-Cylinder Unit Power Plant,
Three-Point Suspension.
Sliding Gear Transmission.
Gear Reduction.
Shaft Drive.
Full-Floating Rear Axle.
Three-Point Platform Spring Suspension.
Easy Accessibility to all Parts.
Beautiful in Design.

Simplicity, Practicability and Durability are the potent features which have made "The Menominee" Motor Truck recognized as the Commercial Car meeting the exact demands of the trade and the best seller on the market.

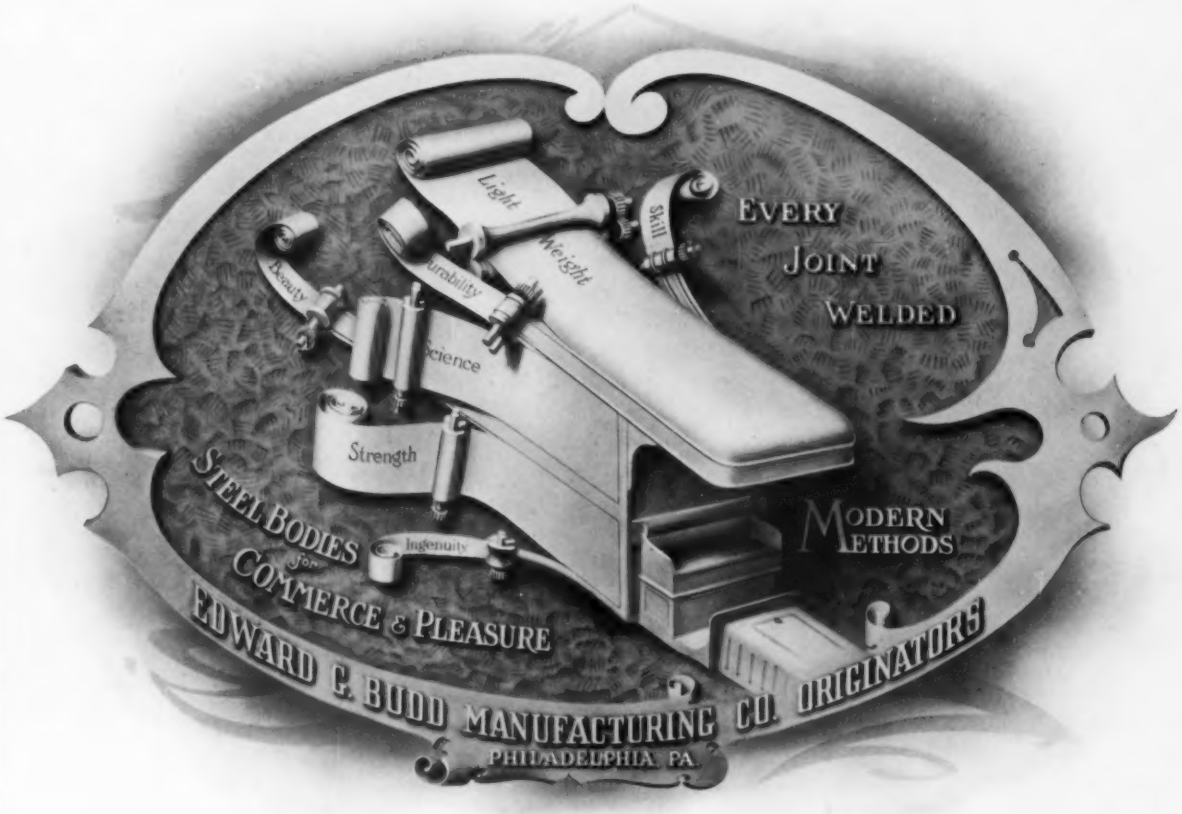
Send For Our Free Illustrated Catalog and Agency Proposition

D. F. POYER COMPANY
MENOMINEE - - - MICHIGAN

Pressed Steel Bodies

for

Pleasure and Commercial Cars



All Bodies Built of Special Pressed Shapes, Welded and Riveted; All Joints and Sharp Corners Eliminated.

Workers of Sheet Metal

OUR FACTORY IS EQUIPPED WITH SPECIAL MACHINERY TO SUPPLY BODIES ON SHORT NOTICE.

Designs and Prices Furnished on Application.

Light in Weight
Maximum Strength
Attractive Design
Newest Methods

Makers of Difficult Shapes in Sheet Steel

Edward G. Budd Manufacturing Company

Factory: Aramingo and Tioga Sts. - - Philadelphia, Penna.

COMPLETE INSTALLATIONS — GASOLINE GMC ELECTRIC TRUCKS — COMPLETE SERVICE

THE Texas Company is a business organization with a very great haulage problem. Motor trucks are solving it. Illustrated above is one of the powerful G M C models in use by this company, equipped with a specially built tank body.

Here is another instance where a haulage business has bought equipment from the largest motor truck builder. It is important that *you* should know the highly standardized G M C line just as the Texas Company and Adams Express Company and dozens of other great and small concerns know it. There is a G M C truck—gasoline or electric—made to solve every haulage problem.

Study every type of every other manufacturer—then *know by investigation* that the G M C line covers every single point made by every separate builder.

Grasp these facts and add your own judgment that it is indeed good business to standardize your equipment by installing trucks *all of one make*—G M C.

This Company was first to realize the necessity of building electric as well as gasoline trucks in all standard capacities.

Today G M C trucks can be had in either power and any standard size. And behind every G M C truck stands G M C "Service" that goes on tomorrow, next year—*and years to come,* guaranteed by the financial prestige of General Motors Company.

These are commanding facts that must be considered when you decide who shall be the maker of *your* trucks.

Correspondence from prospective purchasers and dealers is invited. Write for gasoline and electric catalogs.

GENERAL MOTORS TRUCK COMPANY

29 Cadillac Ave., PONTIAC, MICHIGAN

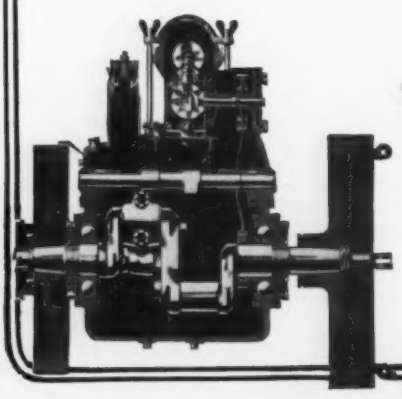
Branches: New York, Chicago, Boston, Philadelphia, Kansas City, Detroit, St. Louis.

Autocar 3000 lb. Truck
Equipped with
Hess-Bright Ball Bearings
on Engine Crankshaft

THE BEARINGS you can trust are those that do not injure themselves as soon as they become slightly worn.

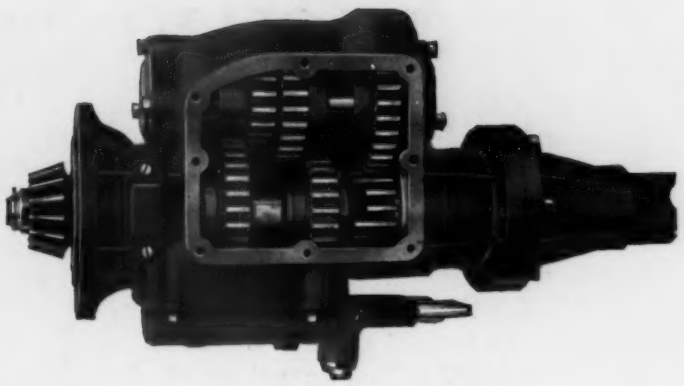
HESS-BRIGHT BALL BEARINGS, owing to their special patented construction, can run looser than any other kind, without danger of suddenly committing suicide to the detriment of their owner's bank account.

It is not always convenient to replace a ball bearing as soon as it is found to be a trifle loose. If the other bearings are snug, the expense of dismantling adds an excessive percentage to the cost of the one bearing replaced. It is cheaper and more satisfactory to wait till other repair work is needed; and with Hess-Bright ball bearings that can safely be done unless the bearing is subject to abnormal conditions of load.



The Hess-Bright Manufacturing Company

41 East Erie Avenue, Philadelphia, Pa.



MANUFACTURERS

Who find their production cost uncomfortably close to their selling price,

Who desire to increase production without adding to present investment in plant and machinery,

Who desire to increase production without increasing their "Overhead" in salaries,

Who wish to overtake, or outrun their competitors by offering more real value for the money,

SHOULD include COVERT TRANSMISSIONS in the list of parts obtained from the manufacturers who specialize in one part of the car.

WRITE to-day, let us demonstrate the claims that we can, owing to specialization, long experience, and abundant facilities, coupled with cheap electric power, save you money, and increase your production and sales.

COVERT can do all of this, and at the same time make a fair profit—because a very large production of one line means a very small overhead per unit.

Covert Motor Vehicle Company

Factory: Lockport, N. Y.

Sales Office: 1422 Ford Building, Detroit, Mich.

DEALERS—Your Truck Opportunity!

Many Styles of Body
but
ONLY ONE CHASSIS
2000 lbs. Capacity

LITTLE GIANT Commercial Cars

The brains of the engineering departments of six Modern Manufacturing Plants Have Made it Possible for the Little Giant to Live and Thrive Without Brains! Four Plants Shown Below.

Model D. Open Body with Flare Boards. Load Space, 44 x 90 inches. Height, 13 inches.

Model D. Platform and Stake Body. Load Space, 44 x 90 inches. Stakes, 30 inches high.

Model D. Full Panel Top. Load Space, 78 x 40 inches, widening to 44 inches. Also made with tail gate and side screens, and tail gate and side and rear screens.

Model D. Open Flare Board with Canvas Top. Load Space, 44 x 90 inches. Height, 57 inches.

IN building your local business to a standpoint of stability and recognized merit, YOU MUST OF NECESSITY offer your customer a product of KNOWN REPUTATION! You cannot afford to conclude selling arrangements with other than a reputable truck concern.

The Builders of "Little Giant" Commercial Cars

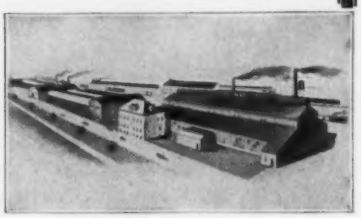
have 20 years in business to their credit,—a capitalization of $6,000,000.00,—a world-wide business reputation,—and a

COMMERCIAL MOTOR CAR OF UNQUESTIONED MERIT!

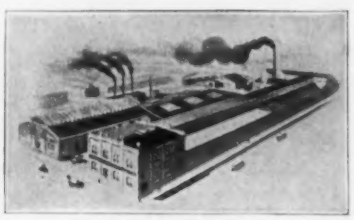
We Want Responsible Dealers

If you want to make big money,—if you want a dependable truck to sell,—if you want the backing of this vast organization,—we want to hear from you now! Write today for complete information, terms, catalog, etc. Act now,—be prepared to secure your big share of the truck business for 1912-1913.

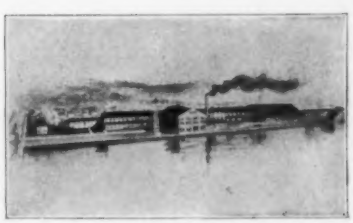
ADDRESS DEPARTMENT M.



Franklin Plant No. 2



Cleveland Plant



Franklin Plant No. 1

Detroit Plant

CHICAGO PNEUMATIC TOOL COMPANY

MANUFACTURERS OF

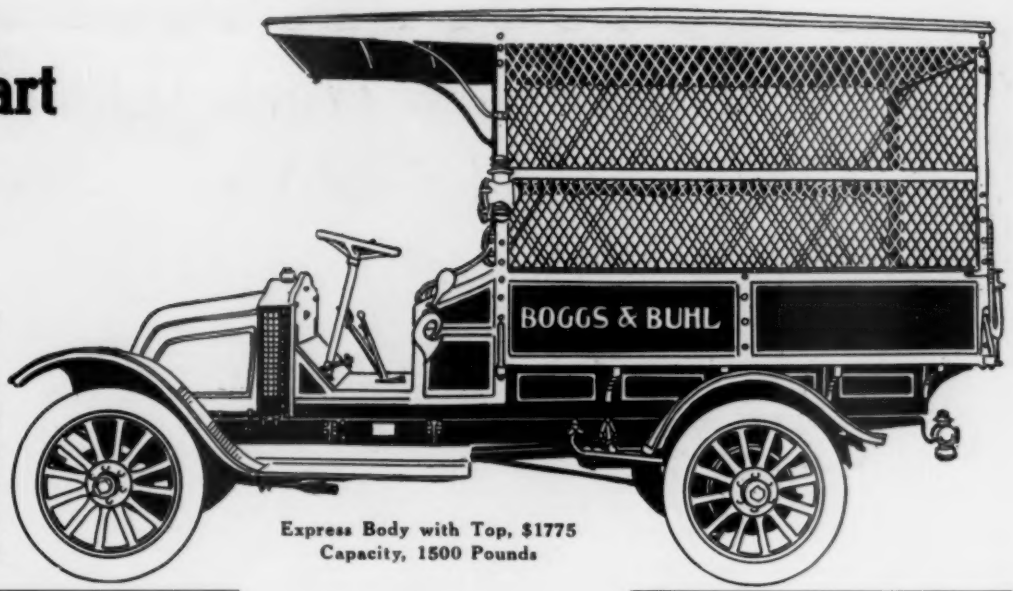
LITTLE GIANT ONE TON COMMERCIAL CARS

General Offices, Fisher Building, Chicago. Eastern Offices, 50 Church St., New York

Lippard-Stewart

The Delivery Car

Panel Body - $1800
Express Body with Top - $1775
Open Box Body $1775
Stake Body - $1775
Police Patrol - $2325
Ambulance - $2325
Hotel 'Bus - $2325



Express Body with Top, $1775
Capacity, 1500 Pounds

LIPPARD-STEWART Delivery Cars have imitators—but no imitation possesses the distinctive features that have made the LIPPARD-STEWART Car Supreme

When you purchase your next delivery car be sure that it is a Lippard-Stewart. See that it bears the Lippard-Stewart identification name plate. Insist upon seeing it. It is your guarantee that you are actually buying an efficient, reliable and economic delivery system. It is proof of pedigree—evidence that you are getting a car that has won its reputation on merit and merit alone.

Lippard-Stewart cars have made good on sound principles. They are the result of a gradual evolution in delivery car building. The features included in their construction are distinctive Lippard-Stewart features—principles of construction which have stood the test of time—features which many of our competitors strive to imitate but ***cannot*** equal. The resemblance lies in price and appearance only.

Lippard-Stewart Delivery Cars

give you the maximum of service and satisfaction at the minimum of upkeep. They are attractive and trim in appearance—dependable and economical in performance—different to a degree from any cars *apparently* competing with them.

The frame of the Lippard-Stewart car is 5½ inches deep at the point of maximum stress. Cars that resemble it are 4½ inches deep.

Lippard-Stewart front springs are 40 inches long and the rear springs 51 inches long. In so-called similar cars, they are 38 and 50 inches long respectively. Our tire specifications are 35 x 4½ inches all around. Imitator's tires are 35 x 4½ inches rear and 34 x 4 inches front.

The rugged Cone Clutch in Lippard-Stewart cars is a vast improvement over the multiple-disc clutch and the transmission is especially built to transmit fifty horse power. The additional facts that Lippard-Stewart cars are equipped with brake equalizers and that the steering gear is designed for a **one-ton commercial truck**—not for a pleasure vehicle—are important details to be considered. Our profusely illustrated catalogue describes Lippard-Stewart construction in full and it is well worth reading. Send for it now.

Special Features of Lippard-Stewart Construction

Continental 30 H. P. Motor
Eisemann Magneto
Brown-Lipe Selective Transmission
Cone Clutch
Full Floating Timken Rear Axle
Timken Roller Bearings Throughout
Special Spring Suspension
Left-hand Drive
Every Part Easy of Access
Tires—35 x 4½ Front and Rear

A Big Opportunity for Dealers

We have an interesting proposition to offer wide-awake business men—the chance of a lifetime. If you are a man capable of handling a big proposition in the right way and have personal integrity, business ability and financial responsibility to back you up, clip the coupon below and send it to us at once. Better still wire us instantly. If we have no representative in your territory, we will send you our dealer's proposition at once.

Lippard-Stewart Motor Car Co.

Buffalo, New York

AUGUST BECKER, President. E. J. BARCALO, Treasurer
J. C. MILLAR, Secretary. C. S. DAHLQUIST, Chief Engineer
W. F. REYNOLDS, Sales Manager

LIPPARD-STEWART MOTOR CAR CO. (CCJ)
Buffalo, N. Y.
Please send catalogue and dealer's proposition.

Name .....
Street .....
City ..... State .....

Garford TRUCKS

GARFORD trucks are responsible trucks—going out day after day to return each night without having faltered. It is because they are balanced with respect to load. Thus wear is properly apportioned. No one part gives out prematurely. Garford trucks are built like the perfect human body—each part in proper relation to the others.

Most important in a motor truck after efficiency is loading space. Garfords give more loading space for the wheel base than other trucks. Despite this advantageous short wheel base, there is no ridiculous overhang. We provided against this worst of truck handicaps. We ingeniously placed the motor alongside the driver's seat—practically under his feet. Easy to get at, economizing in room, it is the one and only place for a truck motor. Here you have the solution of the two most vexing of motor truck problems.

Inspect a Garford and you will concede at once our splendid knowledge of truck construction. It is protected from abuse throughout. The motor is automatically governed. No driver may race it on low gear; neither can he tear a Garford to pieces by exceeding 10 miles an hour. The governor—inside the motor—is your representative.

Distribution of weight is the eternal reason for longevity in any moving body. In Garford trucks 66 per cent of the load is properly placed on the rear axle and 34 per cent on the front. You can see the advantage over trucks where 80 per cent is forced onto the rear axle.

Garford frames, of pressed steel, riveted and bolted, strengthened by five sturdy cross sections, are practically indestructible. They set low between the two durable side springs of imported Krupp steel. A giant jack spring adds its aid under weight of full load—stops crystallization. The strong, free action of Garford springs lengthens truck life.

Every tire on the Garford is guaranteed for 10,000 miles. We asked the tire makers what type tires were needed. We adopted that kind. Now they stand behind them. There is no skimping in a Garford—just generous sturdiness everywhere.

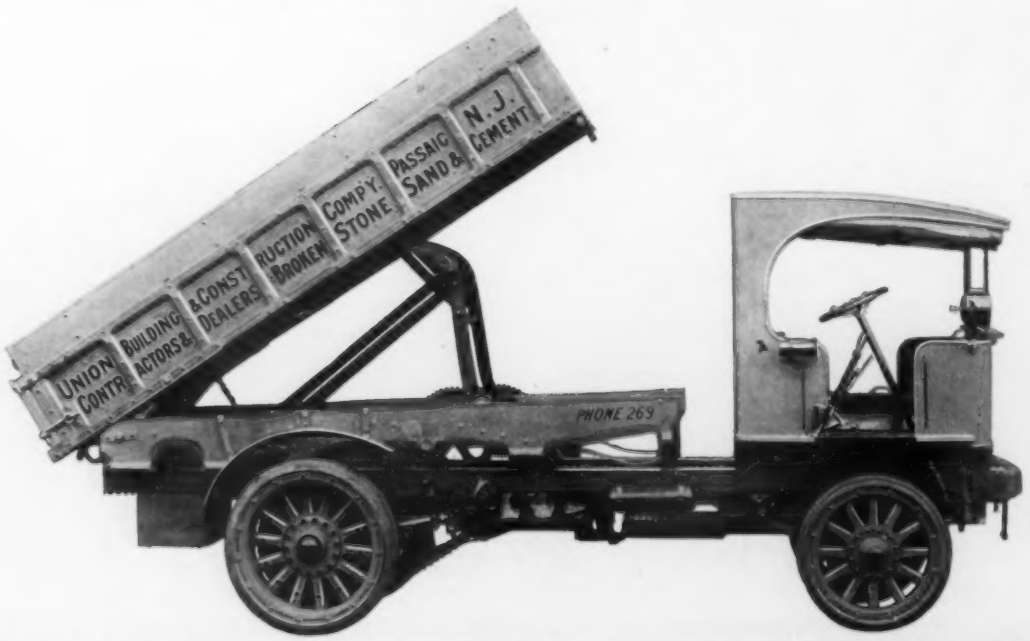
We make Garford axles, transmission gears, steering knuckles, frames, torsion rods to withstand the greatest punishment. They are of a quality and strength we are not afraid of.

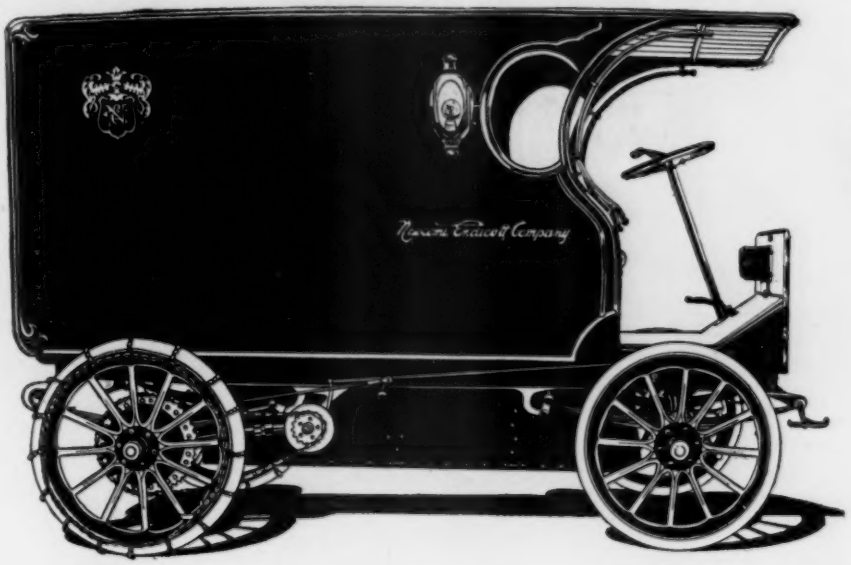
Garford straight line drive and four-speed transmission will take a truck through hub-deep sand or up the steepest hills—and with the least oil and fuel cost.

There is just one way to make your transportation system the standard. Buy a Garford truck—more than one if your business requires it. But it will be a big business to do so. One Garford truck is generally found capable of replacing three teams.

Write us at once. Tell us your delivery problems. We will astonish you with our knowledge of aids. We have statistics to back up our statements. Please address department 11.

The Garford Company, Elyria, Ohio





THE Detroit ELECTRIC
Commercial Vehicles

If You Stop to Think, You Will Recognize the Fact that Wherever Electricity Has Solved Any Problem, it Has Done So Better than Any Other Form of Power

ELECTRIC Delivery is the logical delivery for city use, which requires many stops, just as naturally as electric street railways, electric elevated railways and electric locomotives for steam railway terminals, are superseding all other forms of locomotion under similar conditions.

Detroit Electric Commercial Vehicles "get away" *instantly* in congested traffic. All speeds are controlled by one lever. An ordinary driver can learn to operate a Detroit Electric in a few hours. There is no complex mechanism to be put out of order by abuse or carelessness. When the car stops, the power stops and the expense for power.

Detroit Electric Commercial Vehicles are noiseless, odorless, trim in appearance, and are particularly appreciated by customers in all residential districts. They are admitted at all wharves and freight terminals. Fire hazard is reduced to the minimum. All body space is available, except the driver's seat. They occupy only their own space in a garage.

Detroit Electric Commercial Vehicles are used in sixty (60) lines of business in fifty-six (56) of the largest foreign and American cities.

Detroit Electric Commercial Vehicles are built exclusively for the Edison nickel and steel battery. This battery of itself is about 300 pounds lighter in a Detroit Electric Commercial Vehicle than a lead battery equipment. This admits of an all metal chassis and lighter construction throughout the car. Lighter weight means more mileage, less wear on bearings and tires, and less cost for power to move the car and its load.

48-page illustrated catalogue with full information will be sent on request. Specific information regarding your individual requirements will be gladly furnished.

ANDERSON ELECTRIC CAR CO.

456 Clay Ave., Detroit, U. S. A.

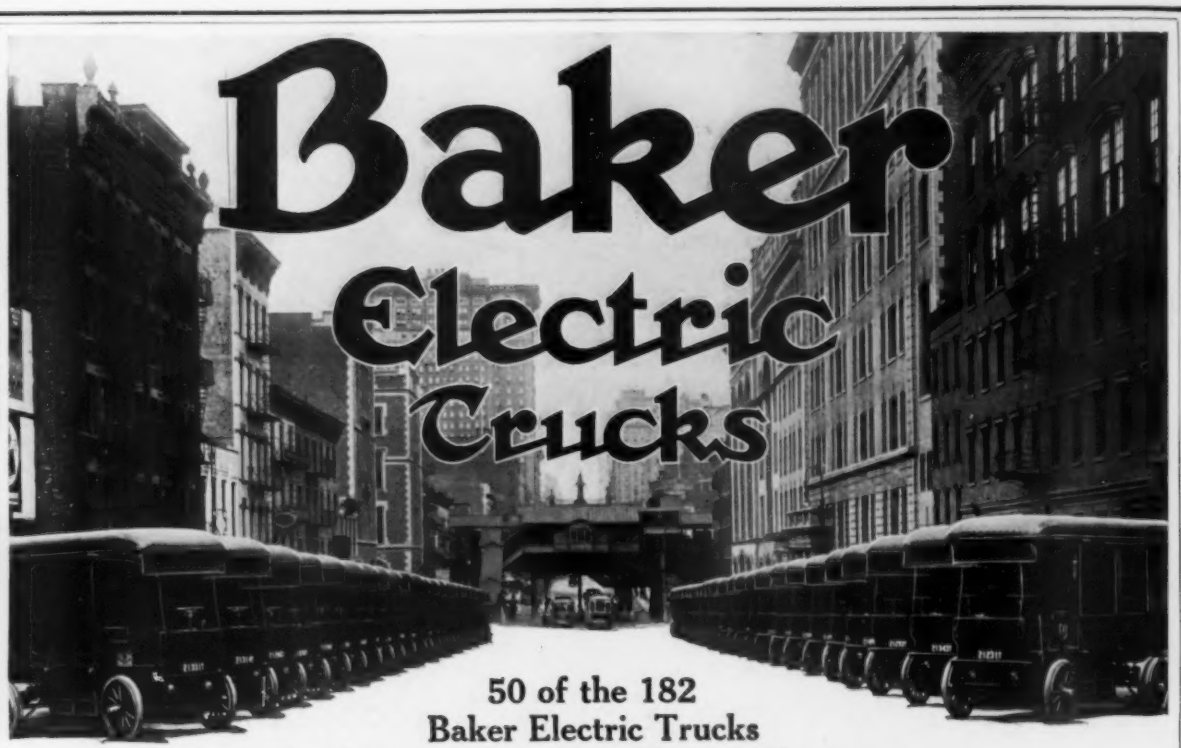
BRANCHES:

Boston
Brooklyn
Buffalo

New York: Broadway at 80th Street. Chicago: 2416 Michigan Avenue
(Also Branch at Evanston, Ill.)
Selling representatives in all leading cities

Cleveland
Kansas City
Minneapolis

LARGEST MANUFACTURERS OF ELECTRIC AUTOMOBILES IN THE WORLD



50 of the 182 Baker Electric Trucks Purchased by American Express Company

A modern merchandise delivery system is chiefly governed by two factors — Economy and Reliability. One of the great concerns to make a special study of this problem in the light of modern transportation requirements was the American Express Company, and to give themselves ample opportunity to try out various cars in their own way they purchased several of different makes, both electric and gasoline, and put them into service.

Over two years of exhaustive comparative tests followed, under conditions calculated to demonstrate beyond all doubt the superiority of one vehicle over another, and the results obtained from the Baker Electrics in these tests, both as to Economy and Reliability, were so highly satisfactory that this Company placed an order for 50 Baker Electrics. It has since placed additional orders, making a total of 182 Bakers.

Any business, large or small, that wants to save money in its delivery department, should get the facts about the wonderful Baker. It is—first, last and all the time—**the truck of Economy,** coupled with unequalled **Reliability.**

Economy of Operation: On account of the small amount of current it consumes—less per ton mile than any other electric truck; on account of its simplicity of construction—non-mechanical and inexpensive men learn to operate a Baker satisfactorily in less than an hour.

Economy of Maintenance: On account of the use of the highest grade materials and workmanship, the small number and cheapness of wearing parts, the accessibility of these parts, the absence of all complicated machinery, no cooling system, no valves, no radiators, no carburetor, no ignition system, no sliding and cam gears, no clutch, no gasoline, no excessive speed.

We stand ready to demonstrate that the month to month maintenance expense of a Baker is far less than that of any other car, regardless of kind or type. Let us send you figures on this point applied to your own conditions.

Fourteen years' experience stands back of every Baker—experience devoted exclusively to electric cars, no experimenting with any other type of machine. It is experience that covers the creation and perfection of every important feature in the development of the industry. With such an engineering record as this, there can be no question as to the correctness of Baker design, construction or workmanship.

The Baker line extends from 500-lb. to 4-ton capacity — all having the service-backing of the largest plant in the world devoted exclusively to the manufacture of electric vehicles.

Let us study your delivery problems. Our Transportation Cost Bureau is at your disposal without charge or obligation.

OPEN TERRITORY: We solicit applications from men or concerns in unoccupied territory who are equipped to handle the Baker along the lines the merit of the truck deserves.

THE BAKER MOTOR-VEHICLE COMPANY, CLEVELAND, OHIO

Manufacturers also of Baker Coupés, Victorias and Broughams

Los Angeles, Tenth and Olive Sts. Chicago, 2023 Michigan Av. Spokane, 818 Fourth Av. Sacramento, 1217 Seventh St. Philadelphia, 1927 Market St.
Kansas City, 3105 Gillham Road New York, 1798 Broadway Boston, 801 Boylston St. Richmond, 1623 West Broad St. Denver, 1549 Lincoln St.
Detroit, 815 Woodward Av. Washington, 1118 Connecticut Av. Seattle, 1718 Broadway
Canadian Branch: Walkerville, Ontario

Representatives in Other Leading Cities

THE FEDERAL
ONE TON TRUCK
$1800

Federal Motor Stage which carries mail, passengers and package freight from Idaho Springs to Alice, Colorado, eleven miles over the mountains, with a 12 per cent grade.

Federal one-ton chassis, extra overload capacity to 3000 pounds guaranteed, including seat—$1800. Body type at purchaser's option. Wheelbase optional, 110-inch or 144-inch. Motor, 4-cylinders, 30 horse power. Magneto, high-tension. Clutch, 16-inch cone. Transmission, three speeds forward and reverse. Tires, solid, 36 x 3½" front and 36 x 4" rear. Timken bearings.

The Federal Carries the U. S. Mail up the Mountain Trail

This trail up the mountain side is the only road into Alice, Colorado.

For years they have used relays of horses to haul the stage up this grade of 2700 feet.

A half dozen gasoline 'buses have been tried. Few were able to make the ascent at all. None did it in schedule time. Because of the altitude every car had to stop and refill the radiator several times. No Denver dealer of Motor Trucks would sell his car for this route.

The first thing the Denver dealer of the Federal did when he secured the Federal agency was to offer a Federal for that route.

We were looking for such a test. That Federal stage has now been climbing the mountain trail from Idaho Springs to Alice at a maximum elevation of 11,000 feet, for four months.

It has carried eight passengers, package freight and U. S. mail, without missing a trip, without one cent's worth of repairs, without refilling the radiator during the trip.

The U. S. mail must be delivered on time. The Federal is the only truck that has been able to do it.

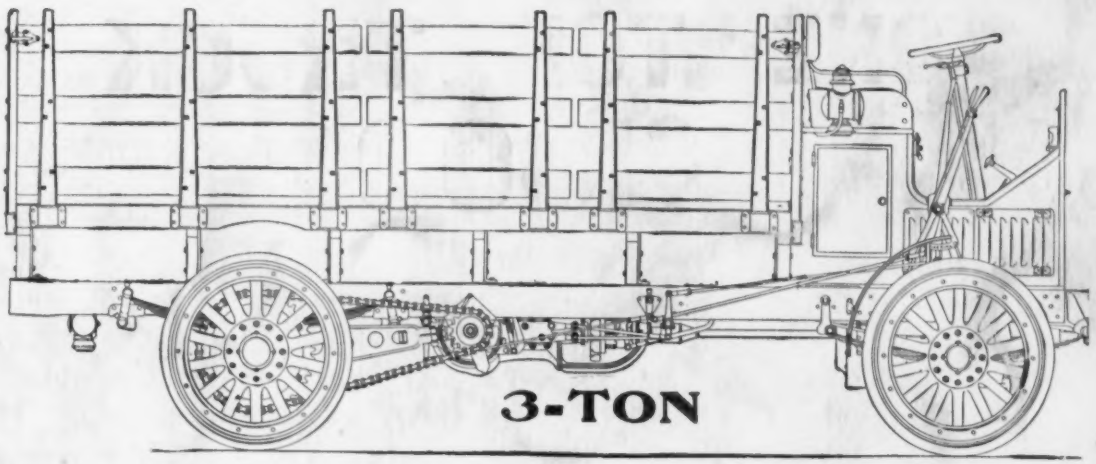
The Federal's 1000 pounds extra capacity, guaranteed, is one reason the Federal is doing regularly and easily what no other truck has been able to do. But that isn't the only reason.

The explanation of unquestioned Federal supremacy lies in unequaled Federal power, capacity, economy and general roadability. The Federal is designed and built to do the thing that hasn't been done.

Federal Motor Truck Co., New Factory Dept. A Leavitt and Campbell Avenues, **Detroit, Mich.**

We Finance the Truck Buyer

The Universal Motor Truck Company Announces the Most Businesslike and Most Liberal Motor Truck Proposition Ever Offered to the Trade.



Here's Our Proposition; It Is Very Simple

A deposit of a **certain percentage** of the cost of the truck **on delivery,** the **balance in time payments,** which will hardly exceed what you would have to pay if you rented a truck by the day.

Why We Can Sell On the Time Payment Plan

Universal Motor Trucks are good trucks.

They are guaranteed.

We know that they will give satisfaction or we could not afford to let the purchaser run them for a year on a time payment basis.

Universal Trucks are manufactured in the largest factory in the country devoted exclusively to making high-grade commercial vehicles.

Prices are no higher than trucks sold for cash.

Universal Motor Truck prices are no greater than those of other standard makes of trucks and in some cases they are less.

$2750 for a 2-ton chassis—$3400 for a 3-ton chassis; bodies cost from $150 up, according to your needs. Price f.o.b. Detroit.

There is no longer any question about the economy value of motor vehicles as applied to business.

Do not let your competitors get ahead of you; here's a chance to be up to date; to make the truck pay for itself.

Tell us about your requirements and let us make you a recommendation.

Universal Motor Truck Company

FACTORIES: DETROIT, MICHIGAN

Fred K. Parke, General Manager **507 Theodore Street**